

The Mining And Metallurgical Journal

VOL. XIX. No. II

LOS ANGELES, CAL.,

September 1, 1898,

SAN FRANCISCO, CAL.

Price 15 Cents

Jessop's STEEL

The Best
FOR

Mining Drills,
Tools, Etc.

I. WILLARD BEAM,
29 Main Street
SAN FRANCISCO, CAL.

THE EDWARD P. ALLIS COMPANY

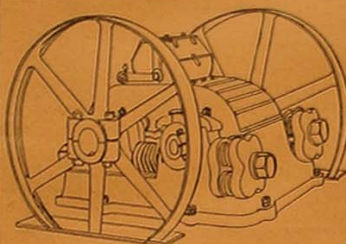
MANUFACTURERS OF

Mining, Milling and Smelting Machinery

Crushers, Concentrators, Pumps, Compressors, Hoists, Boilers,
Reliance Crushing Rolls, Reynolds Corliss Engines, &c.

Send for Catalogue.

Milwaukee, Wis.



HIGH GRADE CRUSHING ROLLS

The Highest Standard of this class of Machinery. Built for hardest service and the Finest Product. Catalogue fully describing.

GENERAL MINING MACHINERY

We publish Fifteen Catalogues Devoted to Mining Machinery

GATES IRON WORKS, 650 ELSTON AVE., CHICAGO
DEPARTMENT 2

THE ROESSLER & HASSLACHER Chemical Co.

100 William St., New York

CYANIDE

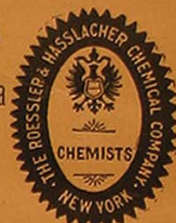
Peroxide of Sodium

Hyposulphite of Soda

Chloride of Lime

Sulphide of Iron

And Other Chemicals for Mining Purposes.



Trade Mark

Joseph Dixon Crucible Co.

MINERS, IMPORTERS AND MANUFACTURERS

GRAPHITE & PLUMBAGO

JERSEY CITY, N. J.

RETORTS, CRUCIBLES, GRAPHITE LUBRICANTS, BELT DRESSING,
GRAPHITE PAINTS, LEAD PENCILS, AND GRAPHITE
PRODUCTS OF ALL KINDS.

Send for Production Catalogue.

Graphite Makes the Best Lubricant and Best Paint.

ADAMANTINE SHOES & DIES

AND

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll
Shells and Crusher Plates.

These castings are extensively used in all the Mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

CHROME STEEL WORKS,

Kent Ave. & Keap St., - BROOKLYN, N. Y.



Stamp Shoes



Stamp Dies

The Pelton Water Wheel

Affords the Most Economical and Reliable Power for Mining,
Electric and all other purposes.

9000 WHEELS NOW RUNNING

PELTON WATER WHEEL CO., 121 Main St., San Francisco, Cal.

Mexican, American and Foreign Patents,
TRADEMARKS, ETC.

Reports on Mining and Other Properties.
Proprietors of Weekly Anglo-American, a first-class Advertising Medium.
Established 9 Years.

C. H. M. y Agramonte,

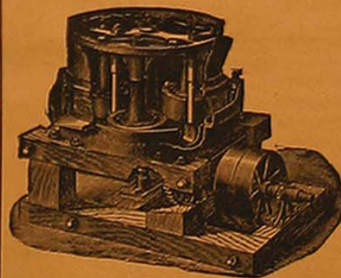
P. O. Box 388, Cable Address, "Agra" CITY OF MEXICO, MEXICO

PARKE & LACY COMPANY

21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

LICENSEE FOR THE MANUFACTURE AND SALE OF

The Huntington Centrifugal Roller Quartz Mill



THE HUNTINGTON MILL is so well and favorably known among mining men throughout the world that any description of it would seem superfluous. They are in use in the United States, Canada, Mexico, Central and South America, Australia, China, Japan, and South Africa. In fact, wherever mines exist, and have given the best satisfaction of all quartz crushing mills.

The construction of this mill has lately been much improved and we claim it to be the

CHEAPEST, MOST EFFICIENT, SIMPLEST, AND MOST DURABLE MILL UPON THE MARKET.

← CATALOGUE UPON APPLICATION →

Refractory Ores Successfully treated by the PORTER ELECTRICAL PROCESS

The Porter Gold and Silver Extraction Company

505 BULLARD BLOCK. LOS ANGELES, CAL.

OTTO HECKELMANN FERDINAND McCANN

ASSAYERS AND CHEMISTS

Heckelmann & McCann + Bullion Dealers

Cash paid for all kinds of Gold, Silver and Ores. All assays and Chemical Analysis at Mexican Silver Rates, 50 per cent. Less than American Price.

PUENTE DE SAN FRANCISCO, No. 6 CITY OF MEXICO

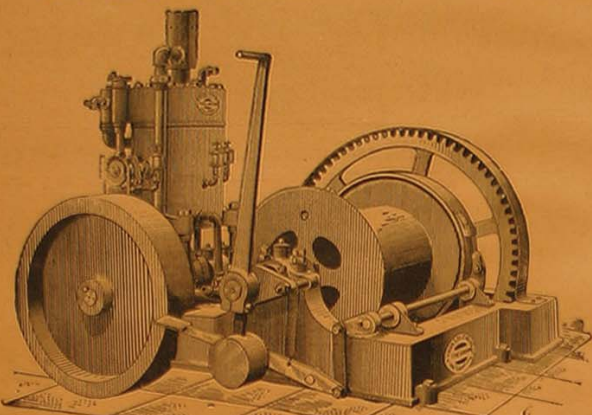
California Vigorit Powder Co.

Manufacturers of

Dynamite High Explosives and "Vigorit Low" Blasting Powder

OFFICE: 208 California Street,
San Francisco, Cal.WORKS: Point Isabel,
Contra Costa Co. Cal.

"Union" Hoist



Union Gas or Oil Engine and Hoist Combined, on strong, iron base.

No Fire No Steam No Boiler No Danger

TEN YEARS' EXPERIENCE. TWO THOUSAND ENGINES IN USE.

Started instantly. Compact, strong, simple, efficient, economical. Perfectly governed, so that oil is used only in proportion to the work done. No expense when idle.

Particularly Adapted to Mining in Localities Where
Fuel and Water are Expensive.Built in the following sizes:—1 H.P., 4 H.P., 6 H.P., 8 H.P., 10 H.P., 15 H.P.,
20 H.P., 30 H.P., 40 H.P.

Send for Catalogue and state what H. P. required.

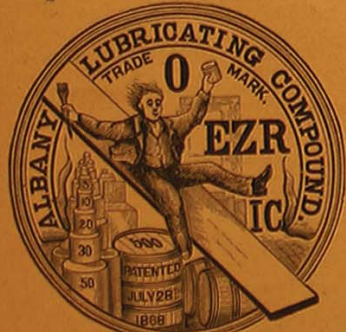
Union Gas Engine Co.,

301 Howard Street. San Francisco, Cal.

YUKON BOATS AND SLEDS

Stern Wheel Boats, 25 ft. to 200 ft. in length. Light draught.
Shipped—knocked down—and set up ready to run. Send for circulars and prices.

SAN FRANCISCO LAUNCH CO. Cor. of North Point and Stockton Sts. San Francisco, Cal.

The only Genuine ALBANY GREASE
has this TRADE MARK on every package. Look out for Yellow Label.MANUFACTURERS OF
Albany Dynamo & Albany Cylinder Oils
If you are not using these Oils give them a trial
at once, and we know the result. You will want
no other.
FRANCIS SMITH & CO.,

— MANUFACTURERS OF —



MINING PIPE ALL SIZES

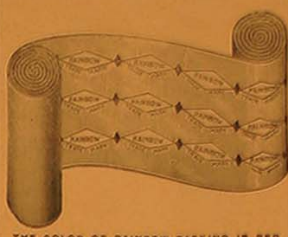
Hydraulic, Irrigation and Power Plants, Well Pipe, Etc., all Sizes.

Iron cut, punched and formed, or making pipe on ground where required. All kinds of Tools
supplied for making pipe. Estimates given when required. Are prepared for coating all sizes of
Pipes with Asphaltum.

150 Beale Street

San Francisco, Cal.

RAINBOW PACKING

THOUSANDS OF
IMITATORS.
NO EQUAL.
WILL HOLD
HIGHEST PRESSUREDon't have to use
Wire and Cloth to
hold RAINBOW.
Can't blow it out.

THE COLOR OF RAINBOW PACKING IS RED

Three rows of Dia-
monds in Black
throughout the
length of each
and every roll.No baking or
following up.PATENTED AND MANUFACTURED EXCLUSIVELY BY
PEERLESS RUBBER MFG. CO., 16 WARREN ST., NEW YORK
16-24 Woodward Avenue, Detroit, Mich. 202-210 S. Water Street, Chicago, Ill.
Dunham, Carrigan & Hayden Co., San Francisco, Cal.

T. & B.

STEEL MINING PIPE

— FOR —

HYDRAULIC, PLACER AND QUARTZ MINING

Riveted up complete or Cut and Punched to be
Riveted at the mine.Well Pipe, Galvanized Air Pipe, Wrought and Cast Iron Pipe. Iron
Tanks of all kinds. Water Supply Material. General
Sheet Iron Works.

Correspondence Invited

Send for prices

THOMSON & BOYLE CO.

306-318 Requesena St.,

Los Angeles, Cal.

WILLIAM H. EMANUEL,

REPRESENTING

RAND DRILL COMPANY,
THE EDW. P. ALLIS CO.,Air Drills and Compressors
General Mining, Milling and Smelting
Machinery and Reynolds Corliss Engine

TRENTON IRON CO.,

HENRY R. WORTHINGTON, General Service and Mining Pumps
ROBIN'S BELT CONVEYOR

DENVER

COLORADO

RICHARD L. COLBURN,

Stock and
Mining BrokerMember of —
Salt Lake Stock and
Mining ExchangeSALT LAKE CITY,
UTAH.

JUST PUBLISHED

SECOND EDITION, REVISED AND MUCH
ENLARGED.

Gas, Gasoline and Oil Engines

By GARDNER D. HINOOK, M. E.

The only American book on the subject, 324
pages, 8vo, illustrated with 270 handsome engrav-
ings. Price \$2.50. Full of general information
about the new and popular motive power, its
economy and ease of management. Also chapters
on Horseless Vehicles, Electric Lighting,
Marine Propulsion, etc. Copies sent prepaid on
receipt of the price. Our large book catalogue
of 96 pages, covering every branch of practical
science, sent free on request. Address

NORTON W. HENLEY & CO.

132 Nassau Street, New York

TRIPP METALLIC PACKING

FOR
PISTON RODSMining Trade
Solicited

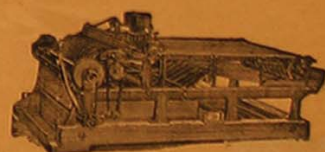
WM. B. MERRILL & CO.,

SOLE MANUFACTURERS
Office and Factory, 295 Congress Street
BOSTON, MASSACHUSETTS

PATENTS!

TOWNSEND BROTHERS
SOLICITORS
OF PATENTSPatents on Inventions secured in all coun-
tries. Copyrights, Trade Marks and Labels.
Office, 9, Downey Block,
Telephone 347. Los Angeles, Cal.

WOODBURY CONCENTRATOR



No. 141 First St. - San Francisco

McDearmon & Co.

Asbestos Boiler & Steam Pipe Coverings

Asbestos Cement for Boilers, drums, Heaters,
Etc. Special facilities for supplying
the mining trade.Pacific Coast Agent for H. W. John's Co's Asbestos
Sectional Coverings.

429 Sacramento Street, San Francisco, Cal.

MACHINERY

STAMP MILLS, Marine and Stationary
ENGINES and BOILERS, Saw Mills and all
kinds of new and second hand machinery.

Send for Catalogue

WASHINGTON MACHINERY DEPOT
TACOMA, WASHINGTON

J. W. Paxson Co.

FOUNDRY

Facings, Supplies, Equipments

COMPLETE OUTFITS

Philadelphia, Pennsylvania

ALPHABETICAL INDEX TO ADVERTISERS

A		E		L		S	
Abbott, W. O.	28	Elmer & Amend	4	Lambert Hoisting Engine Co.	32	Santa Fe Route	22
Acton Powder Co.	2	Elms, H. R.	27	Leffel & Co., James	28	San Francisco Launch Co.	2
Agramonte, C. H. M. y.	1	Emmett, Wm. H.	2	Lehigh University	30	S. F. Pioneer Screen Works	29
Albright, Wm.	29	Rynon-Evans Manufacturing Co.	26	Letow, Thos.	21	Selby Smelting & Lead Co.	23
Albuquerque Foundry & Machine Works	24			Lidgerwood Manufacturing Co.	5	Simonds & Wainwright	30
Allis Co., Edward F.	21			Lowman & Calkins	5	Silver City Reduction Works	27
Almender & Sons, Thos.	4			Lord, Geo. W.	5	Smith, S. J.	6
American Diamond Rock Drill Co.	30			Luttwiler S. W.	25	Smith & Irving	17
Asbury, L. F.	19					Smith & Co., Francis	2
B		F		M		T	
Bailey A. A.	24	Faith & Co.	27	Machinery and Electrical Co.	29	Taylor & Co., John	27
Baker & Adamson Chemical Co.	3	Fay & Egan Co., J. A.	5	Masters, J. H.	28	Taylor Iron and Steel Co.	6
Baker & Hamilton	3	Ferrari, Guido	28	Mathison & Co.	23	Thomson & Boyle	2
Baker Iron Works	22	Foot, Dr. A. E.	4	McDearmon & Co.	2	Tomlinson, J. B.	5
Bald & Co., Henry Carey	21	Fowler, G. C.	17	Merrill, William B. & Co.	2	Townsend Bros.	5
Barnes & Co., W. F. and John	1	Fraser & Chalmers	18	Moller, E. C.	21	Tremaine & Froehlich	24
Beam I. Willard	1	Frese, Adolf	30	Montgomery Machinery Co., J. H.	24	Trenton Iron Co., The	21
Bockley & Co., A. J.	26	Frue Vanning Machine Co.	21	Moore & Co Chas C.	4	Troemer, Henry	24
Bell, Newton M.	21					Trux Manufacturing Co.	5
Bi Metallic Assay Office	22			N		U	
Bickford Drill Co.	28	Gerratt & Co., W. T.	27	National Iron Works	25	Union Gas Engine Co.	2
Blake Mfg Co. Geo. F.	34	Gates Iron Works	1	National Pipe Bending Co.	26	Union Hardware & Metal Co.	22
Borden, Carl	31	Giant Powder Co. Con	28	New Haven Mfg Co.	25	V	
Booth & Co., C. B.	31	Glauding Co., James	28			Van Der Naltes, A.	5
Breadley-Ramsey Lumber Co.	32	Globe Iron Works	22	O		Van Nstrand Co., D.	4
Bradley Pulverizer Co.	6	Goodyear Rubber Mfg Co.	4	P		Voll, C. H.	17
Brandis & Son, F. E.	3	Grumwold Chas F.	18	Pacific Mining Machinery Co.	21	W	
Brown, M. E., Roscoe F.	30	Gutta Percha Rubber and Mfg Co.	23	Pacific Tank Co.	25	Wade & Wade	23
Brownell, James S.	30	H		Paraffine Paint Co.	26	Warren, A. A.	18
Buff & Berger	22	Hamlin & Morrison	27	Parker & Lacy Co.	1 & 32	Washington Machinery Depot	2
Bullock Mfg Co., M. C.	5	Hawell Iron Wks Co.	22	Paxson & Co., J. W.	2	Watson, R. N.	32
Barbridge, S. L.	27	Harrington & King Perforating Co.	4	Pelton Water Wheel Co.	25	Weber Gas and Gasoline Engine Co.	8
Barlingame, E. R.	30	Harper & Reynolds Co.	24	Penn Smelting and Refining Co.	25	Weber & Co., F.	29
Barlingame, N. D., M. R.	24	Heckelmann and McCann	1	Perkins Pump and Engine Co.	30	Weigle Pipe Works	27
C		Hercules Gas Engine	17	Peerless Rubber Manufacturing Co.	2	Western Chemical Co.	28
Caldwell Bros.	21	Hendley & Co., Norman W.	24 & 32	Philadelphia Book Co.	28	Western Forge & Rolling Mills	26
Cal Bellows Mfg Co.	24	Henshaw, Bulkeley & Co.	5, 22, 23, 24, 25, 26, 28	Porter Gold & Silver Extraction Co.	1	Whitney Co.	23
California Perforating Screen Co.	29	Hersey, Clarence	27	Pope, J. B.	25	White Rogers & Co.	47
California Wire Works	29	Heer, Peter	5	Price & Son, Thos.	29	Wilcox & Rose Co.	30
California Vigor Powder Co.	2	Hoff Asbestos Mfg Co.	17	Pueblo Foundry and Machine Shop	29	Williams, F. A. A.	24
Chapman Smelting Works Co.	24	Hookins & Co., Wm.	30	Pueblo Smelting & Refining Co.	31	Wilson, J. Howard	4
Chester Steel Castings Co.	24	Howe, Frank H.	31	Pulsometer Steam Pump Co.	21	Wimmer Geo	29
Chicago School of Assaying	1	Hubbard, W. E. & Co.	21	Q		Witte Iron Works Co.	30
Chrome Steel Works	2	Hunt, Fred. F.	6	Queen & Co.	24	Woodbury Concentrator Co.	2
Colburn, Richard L.	23	I		Quick, John W.	29	Woodward, E. C.	25
Colorado Iron Works	23	Imperial Chemical Co.	22	R		Y	
Cook's Sons, Adam	3	Incorporated Mines Paying Dividends	20	Reed, John T.	30	Yawger, I. C.	21
Cole and Cal. Mineral Development Co.	4	Ingersoll, Sergeant Drill Co.	19	Read, Edward R.	35		
Compania Industrial Mexicana	26	J		Ready Rock Asphalt Roofing Co.	24		
Conway & Co., F. J.	28	Jackson Drill and Manufacturing Co., The	24	Ricketts & Banks	19		
Consolidated Pipe Co.	4	Jeffery F. M.	3	Rio Grande Western Ry.	3		
Con. Kansas City Smelting & Refining Co.	30	Jessops Steel Co.	18	Rosier & Hasselbacher Chemical Co.	31		
D		Judson, A. F.	18	Robins Conveying Belt Co.	30		
Dame, W. E.	5	K		Rogers & Baldwin	34		
Daniel, C. A.	26	Kenfel & Eiser Company	6	Russell & Co.	18		
Davis Iron Works Co., F. M.	5	Keystone Lubricating Co.	6				
Degen, I. F.	1	Kohlschuch, St. Herman	6				
Dennison, E. G.	25	Krogh Manufacturing Co.	19				
Denver Fire Clay Co.	27 & 29						
Denver Public Sampling Wks	31						
Dee & Co., Thos. J.	30						
DeSolla Deussing Co.	25						
Dickman & Mackenzie	1						
Dixie Crucible Co., Jos.	30						
Drake, Dr. W. F.	30						
Ducumman, C.	23						

Crude Platinum Purchased.

To Identify Crude Platinum when found, send 75c for Sample in glass, packed in a strong box. We purchase or refine anything containing Platinum.

BAKER & COMPANY,

NEW YORK OFFICE: 121 Liberty Street.

NEWARK, NEW JERSEY

ALL THE MINING CAMPS OF UTAH AND COLORADO ARE LOCATED ON OR REACHED BY

The Rio Grande Western Ry.

MERCUR:

The Johannesburg of America, New and Wonderful Camp only 45 miles from Salt Lake City, Utah.

CRIPPLE CREEK:

The Greatest Gold Camp in the World, only six years old and two hundred shipping mines in the district.

THE SHORTEST, QUICKEST AND MOST DIRECT ROUTE TO

MERCUR AND CRIPPLE CREEK

P. K. WROBLEIGH,

GENERAL PASSENGER AGENT,
Salt Lake City, Utah

DICKMAN & MACKENZIE
MINING ENGINEERS,
ASSAYERS AND CHEMISTS

1224 BROADWAY, CHICAGO BOX 77, EL PASO, TEXAS

Orders by mail or express promptly attended to. Mining properties examined.

F. M. JEFFERY,
MINING LAWYER

212 Wilcox Bldg., Los Angeles, Cal.

Five years in Cripple Creek, Colo.

Holsts
Engines
Pumps
Blowers



Weber Gas and Gasoline Engine Co.

434 S. W. Boulevard,
Kansas City, Missouri.

CHAS. C. MOORE & CO.

ENGINEERS AND DEALERS IN

BABCOCK & WILCOX BOILERS.

McINTOSH & SEYMOUR ENGINES,

HAMILTON CORLISS ENGINES,

N. Y. SAFETY AUTOMATIC ENGINES,

GOUBERT FEED WATER HEATERS,

STRATTON STEAM SEPARATORS,

SNOW STEAM PUMPS,

QUIMBY SCREW PUMPS,

GREEN'S ECONOMIZERS,

WHEELER CONDENSERS,

BARNARD-WHEELER COOLING TOWERS,

HOPPE'S LIVE STEAM PURIFIERS

EDMISTON FEED WATER FILTERS,

BUNDY STEAM TRAPS,

SPENCER DAMPER REGULATORS,

HYATT ROLLER BEARINGS.

Watch this Space for description of the above Machinery.

Send for Catalogue and Full Information.

19 First Street, San Francisco, Cal.



GOODYEAR'S

RUBBER GOODS

— FOR —

Miners and Mining

GATHERING RUBBER, Crack Proof Boots, White Rubber Coats, Oil Clothing

BELTING, PACKING AND HOSE

573, 575, 579 Market Street,
SAN FRANCISCO, CAL.

73 and 75 First St.
PORTLAND, OREGON



Diamond - Pointed
Core Drills

AMERICAN
DIAMOND ROCK DRILL CO
120 Liberty St., New York.
P. O. Box 1442.

COMPLETE

MINERAL CATALOGUE

186 pages with 40 engravings; contains table giving name, composition and form of all known minerals with other valuable lists and tables. The best book of the kind ever published, for students, prospectors, mining experts, chemists and others. Prices post paid, paper 25c, cloth 50c; call \$1.00. SPECIMENS PURCHASED of Ores or fine crystallization. Correspondence invited. PRICE LIST FREE.

Dr. E. A. Foote, 1317 Arch St. Philadelphia, Pa.
Established 1876

Trade Mark

JENA
Normal
Glass

SCHOTT & GEN.
JENA

BEST GLASS
FOR
Laboratory use

CHEMICALS AND
CHEMICAL APPARATUS

ASSAY BALANCES
Finest Ever Made

Specialties:—Analytical Portable Balances, Porcelainware, Platinum goods, Crucibles, Cupels, Scorifiers, Muffles, Furnaces, C. P. Acids, etc.

Everything Necessary for Assayers

Elmer & Amend,
3d Ave. Cor of 18th St. New York

Advertise in
The Journal

J. HOWARD WILSON

Assayer and Chemist

A Specialty Made of Umpire Work.

306 Santa Fe Ave., Pueblo, Colo.

The Standard Authority

One Volume, Small Quarto, 313 Pages, 72 Illustrations, \$5.00.

A Practical Treatise on
Hydraulic Mining in California
By AUG. J. BOWEN, JR., Mining Engineer

CONTENTS
The Records of Gold Washing. General Topography and Geology of California; The Distribution of Gold and Deposits, and the Value of Different Strata; Amount of Workable Gravel Remaining in California; Preliminary Investigations; Reservoirs and Dams; Measurement of Flowing Water; Ditches and Flumes; Various Mechanical Appliances; Blasting Gravel Banks; Tunnels and Sluices; Tailings and Dump; Washing or Hydraulic Mining; Distribution of Gold in Sluices; Loss of Gold and Quicksilver; Duty of the Miner's Inch; Statistics of the Costs of Working, and the Yield of Gravel.

D. VAN NOSTRAND CO.

PUBLISHERS

23 Murray and 27 Warren Sts., New York
Copies sent by mail on receipt of Price

CONSOLIDATED PIPE COMPANY,
IRON AND STEEL WATER PIPE A SPECIALTY



873-889 STEPHENSON AVENUE, LOS ANGELES, CAL.

A. C. HARPER, Proprietor.

Telephone Main 420

Post Office Box 867

THE COLORADO and CALIFORNIA Mineral Developing Co.

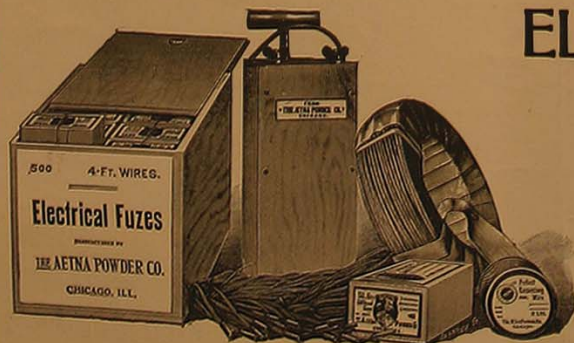
433-4-5 STIMSON BLOCK, LOS ANGELES, CAL.

Prospecting, Developing of Mines, Mine Operators, Locating, Buying and Selling of Mines a Specialty, Financial Agents for Eastern Capitalists.

GAIL BORDEN, President
J. A. COMER, Vice-President
J. K. HAWK, Secretary

CAPITAL STOCK, \$200,000

Correspondence Solicited



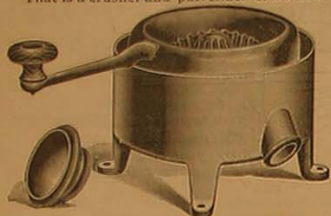
Send for our illustrated pamphlet

ELECTRICAL FUZES

BLASTING MACHINES
LEADING WIRE
CONNECTING WIRE

THE AETNA POWDER CO.

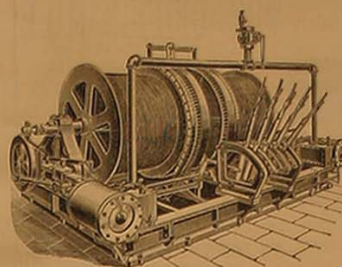
188 MADISON STREET
CHICAGO - ILL.

A NEW MORTAR
That is a crusher and pulverizer combined.

Weight 110 lbs.; Diameter 10 1/2 in.; Height 8 1/2 in.
Fills a long-felt want. Send for descriptive
circular. Crusher Pulverizer No. 1, \$25.00.
J. E. Surman & Co., 74 Cortlandt St., New York

**Lidgerwood
Hoisting
Engines**

Built to gauge on the Duplicate
Part System. Quick Delivery Assured.



HENSHAW, BULKLEY & CO., Agents, San Francisco,

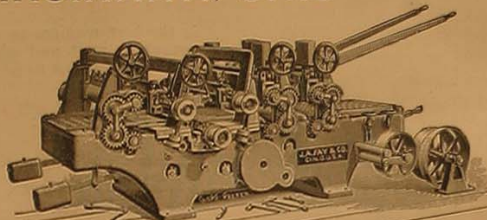
New York

**Mine Hoists,
CABLEWAYS**

Conveying Devices, for Mining, Quarrying,
Logging, Dam Construction, &c.

Electric Hoists and Appliances

Lidgerwood Mfg. Co.

J. A. FAY & EGAN CO.
CINCINNATI, OHIO**Wood
Working
Machinery**

— FOR —

Box Factories, Planing Mills, Sash, Door & Blind Factories
Carriage, Wagon and Agricultural Shops.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal

THE NATIONAL IRON WORKS

Riveted Boilers, Tanks, and Sheet Steel or Iron Work of every description

MANUFACTURER OF THE

Repairing of All kinds Promptly Attended to.

PORTLAND, OREGON

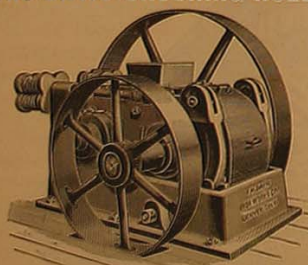
National Steel Ore Car

**The F. M. Davis
Iron Works Co.**

Office and Works 723 to 743

LARIMER STREET,

Corner 8th Street, DENVER, COLO.

The DAVIS CRUSHING ROLLS**SIMPLE, DURABLE, EFFICIENT**

These machines are built in 5 sizes
27"x14". Belt Driven, \$950.00. Weight
13,000 pounds.

SEND FOR CATALOGUES and DISCOUNTS

**OUR
New Book****ESSAYS UPON**

Boiler Incrustation and Corrosion.
Boiler Explosions, The History of
Natural Water Contamination.

BY GEO. W. LORD, is now ready

We will send this interesting little book free of

cost to

EVERY SUPERINTENDENT

OR ENGINEER

Who will state his occupation. By whom em-
ployed. Total Boiler capacity. What Scale pre-
ventive he is using. The cost of the article. And
how long the supply will last. Address

Geo. W. Lord,

Philadelphia
Pa.

J. B. TOMLINSON, M. E.

Prescott, Arizona,

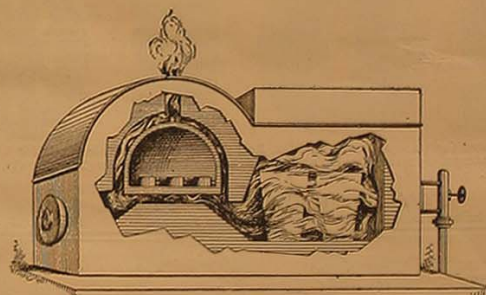
MINING PROPERTIES EXAMINED, AP-
PROVED AND REPORTED UPON

AND
Supervision taken of the development of prop-
erty and the operation of mines.

FOR SALE!

One 36"x84" Water Jacket Furnace, Boiler, Engine
Blower, Rock Breaker, Scales, Shafting, Pulleys, Belting,
Tools and all fittings and fixtures complete and new, built by
Frazer & Chalmers; also one 16x42 Hamilton Corliss Engine;
one 12x20 double Cylinder Hoisting Engine. Will be delivered f. o. b.

W. E. DAME, CERRILLOS, NEW MEXICO

**LONERGAN & CALKINS'
Combined Melting and Muffle Furnace.**

Both furnaces always hot and ready for use. One burner suffices. A saving of one-half in fuel
used. Compact and convenient to transport to and from mines and on prospecting trips. Furnace
revolves on a pivot. After making one melt with burner inserted in melting and reverse furnace,
insert burner in muffle end and you are prepared to continually melt and cupel without further dis-
turbance. A special feature of this is the oxidizing bonnet (not shown in illustration) by
which a continuous flow of fresh air, controlled by a damper, is passed through the muffle.

LONERGAN & CALKINS,

Gold and Silver Refiners,
Assayers and Bullion Buyers.

127 West First Street,

LOS ANGELES, CAL.

**THE TRUAX PATENT IMPROVED
AUTOMATIC ORE CARS**

Manufactured by
CHAS. B. BOOTHE & Co.

126-128
SOUTH LOS ANGELES ST.
LOS ANGELES, CAL.



Pat. Jan. 2, 1892, Pat. Aug. 27, 1895.

Send for our Catalogue and Prices

Bullock's Diamond Prospecting Core Drills

These are the only Machines which will give absolutely accurate records of
borings. Fifteen styles and sizes. Operated by hand, horse, steam, air or
electricity.

Monarch Rock Drills

Any style of mounting. Simple, compact, economical. Operated by air or steam
Hoisting and Haulage Machinery to fill any requirements.

M. C. BULLOCK MFG. CO.,

1178 West Lake Street,

CHICAGO, ILLINOIS

S. S. MACHINERY CO.

Buy, Sell and Trade in All Kinds of SECOND-HAND
Mining and Wood Working Machinery.

CORRESPONDENCE SOLICITED.

OFFICE: 1529 Lawrence
WORKS: Sixth and Market

DENVER, COLORADO

TELEPHONE 120
Office, 120
Works, 1234

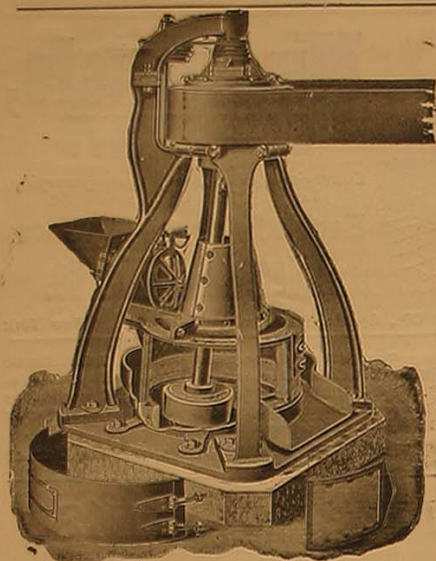
*** SCHOOL OF ***
Practical Mining, Civil, Mechanical,
Electrical Engineering, Metallurgy,
Cyanide Process, &c.
Surveying, Architecture, Drawing and Assaying.
933 MARKET ST. SAN FRANCISCO, CAL.
OPEN ALL YEAR
A. VAN DER NAILLEN, President.
Assaying of Ores, \$25; Bullion and Chlorination
Assay, \$35; Blowpipe Assay \$10. Full Course
of Assaying, \$50. Established 1864.
Send for Circular.

PETER HEER,

232-234 E. Washington St., CHICAGO
Manufacturers of Highest Class

Engineering and Mining Instruments

T-Squares, Triangles, Scales, Etc. Repairs care-
fully and promptly executed. Drafting Sup-
plies of all kinds. Catalogue on application.



THE GRIFFIN MILL

The only Perfect Pulverizer Working both Wet or Dry Process

NO JOURNALS IN PULVERIZING CHAMBER.

Delivers a finished product. Will pulverize 1 to 2 tons per hour on Portland Cement, Quartz or ores depending on hardness of material and firmness of product.

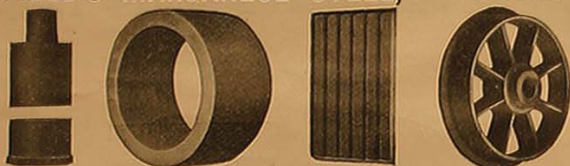
— Manufactured and Sold by —

Bradley Pulverizer Co.,

92 STATE STREET,
Boston, Mass.

HADFIELD'S MANGANESE STEEL,

HARD, TOUGH.



Best Metal known for Stamp Shoes and Dies, Roll Shells, Crusher Plates and Side Liners. Toggles and Toggle Bearings, Gyratory Cones and Concaves or Liners, Mine Car Wheels, Coal Crushing Rolls, Etc., Etc.

TAYLOR IRON AND STEEL CO.,

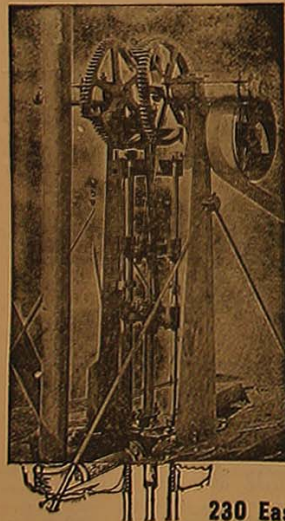
Sole Licensees in America under Hadfield System and Patents.

High Bridge, N. J., U. S. A.

KEUFFEL & ESSER CO.
NEW YORK.
127 FULTON AND 42 ANN STS.
Branches: 111 Madison St., Chicago; 708 Locust Street, St. Louis, Missouri
Drawing Materials and Surveying Instruments
Largest and best assorted stock in America. All requisites for field, mine, and draughting room. We have made a study of this line, and our goods are warranted to be as nearly perfect as it is possible to make them. Prices reasonable. Write for catalogue.

Agent FULTON POWER PUMPS

With Capacities up to 30,000 gallons per hour.
Made by A. T. Ames, of Galt, Cal.



Fred. F. Hunt, E. M.

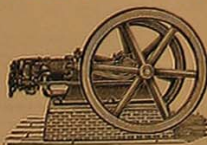
Chemist and Assayer

Weighing, Sampling and Assaying all Minerals
Specialties: Lead, Bullion and Umpire Assays
Samples by Mail or Express.
77 Pine Street, New York City

LAMBERT

Gas, Gasoline and
Distillate Engines

TANKS, PIPE
and WATER
SUPPLY
GOODS



Call on or Address,

S. J. SMITH,

230 East Fourth Street,

LOS ANGELES, CAL.

Preach at 'Em!



If you want the Miners of North and South America to know you are on earth, you've got to "Preach at 'em."

The Mining and
Metallurgical Journal

is the best medium to use—do all your preaching in it, and miners all over the world will listen to you.

OFFICES:

Stimson Block, Los Angeles and
64 Merchants' Exchange,
San Francisco, Cal.

KEYSTONE LUBRICATING GREASE

The only grease adapted to all temperatures. It will not splash or drip like oil.

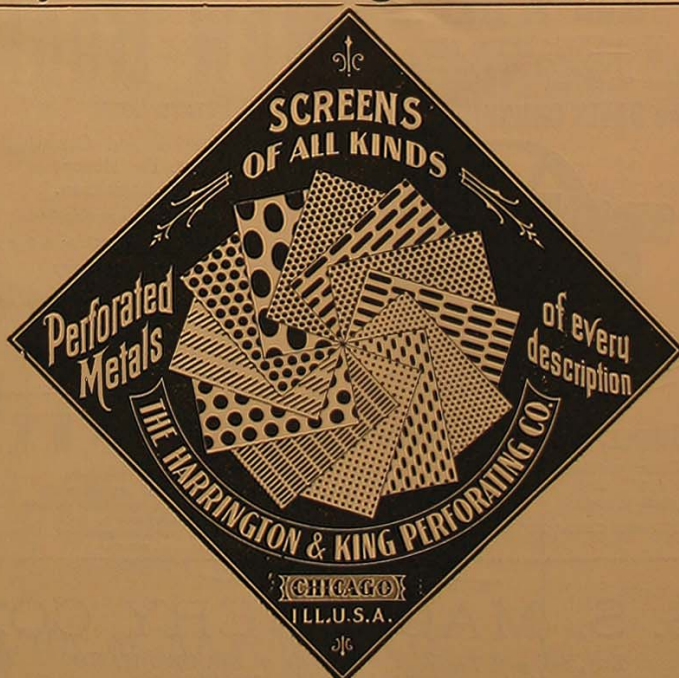


Our goods are not for sale by the Jobbing trade. If you want the genuine Keystone Grease it can only be obtained from us.

A full set of brass cups furnished FREE on first purchase

Especially adapted for Air Compressors and all kinds of Machinery in connection with Mines, Mills and Smelters. Send for trial sample and Cup Free of Charge.

Keystone Lubricating Co. 20th & Allegheny Ave.
Philadelphia, Pa.



The Harrington & King Perforating Co.

127 N. Union St., Chicago Ill.

Eastern Office, 284 Pearl St., New York

The Mining And Metallurgical Journal

ENTERED AS SECOND CLASS MAIL MATTER.
OFFICE OF THE PUBLISHER AT LOS ANGELES, CALIFORNIA
AS SECOND CLASS MAIL MATTER.

VOL. XIX. SEPTEMBER 1, 1898. No. 11.

F. W. EDELSTEN, Editor.

O. S. BREESE, Business Manager.

JOHN STEWART, Special Contributor.

ULRICH KNOCH, Publisher

OFFICES: Stinson Block, Los Angeles, Cal.
64-65 Merchants Exchange, San Francisco, Cal.

SUBSCRIPTION PRICE:

For United States, Mexico and Canada.....	\$2.50 per annum
.....	1.25 six months
All other countries in the postal union.....	3.50 per annum
.....	1.75 six months

ISSUED SEMI-MONTHLY

ADVERTISING RATES FURNISHED ON APPLICATION.

MILLING OF CUSTOM ORES.

The milling of custom ores in the Western United States is a large branch of the mining industry of that section of the country. It is not regulated or controlled by any federal or state laws, and, in consequence, the small mine owner has to trust to his own sampling as a check, and also to the honesty of the mill owner and his employees, to receive the full returns from the ore which he has had treated at the custom mill.

When the mill owner is strictly honest, and is also blessed with the services of honest employees, there is no cause of complaint, but, unfortunately, this happy condition of affairs is not always the case, hence the necessity for having the industry regulated by law, so as to protect the small mine owner. Every mine owner knows the difficulty of attaining a correct sample of the value of gold ores, and for this reason the mill owner has occasion to exercise all possible care and precautions to protect his customer against the possibility of dishonest employees, defrauding his client. The most approved form of sampling machines ought therefore to be a necessary part of all mills doing custom work. To run the ore through the mill without sampling, and make returns of the amount of gold saved, is no proper way of doing custom milling, as it does not show the amount of gold lost in the tailings. The milling of custom ore can consequently be done for three or more reasons: first, to obtain returns from the ore mined; and, second, to ascertain the value as a free milling proposition of that ore; and, third, to ascertain the best manner of treating a new class of ore. For these reasons, careful sampling and honest work are necessary. The whole system of conducting this branch of the mining industry is conducted on such a loose, go-as-you-please, style in too many instances, that it requires wide discussion, so as to arrive at the best manner of regulating its operation.

FOREST RESERVE INSPECTION.

During the past two weeks, an extensive forest fire has been burning in that part of the Los Angeles county reservation situated between Strawberry Mountain on the west and Barley Flats on the east, and on the south bank of the Big Tejuanga water shed, which has resulted in the destruction of many miles of valuable pine timber.

The origin of the fires is too often caused

by campers lighting fire at noon for cooking purposes when the wind is high in that district, and in not putting the fire out after the noon meal is cooked. The result is that the largest body of pine in the center of the reservation is now almost all destroyed. The inspector, Mr. Allan and six men under him were reported in the local papers, prior to this, to have put the fires out which were burning for some weeks prior to the present outburst, but such was not the case, for the present fire is but the continuation of that which was reported to have been extinguished, for so we are informed by a miner who has watched its progress from the district north of the Big Tejuanga, opposite to where the destruction was done. In this matter, we may ask the question, if the government issues orders and pays men to fight forest fires at twenty-five cents an hour per man, how does it happen that the inspector has no funds or power to prosecute sheepherders who have trespassed on the reservation since spring in the Little and Big Rock Creek districts, and are there now, with several thousand sheep? It is to the miners' interest to have both the timber and vegetation protected, as the water supply at present is not sufficient to admit of milling ore, and just sufficient at many springs for household purposes.

The direction of the wind in the mountains at this season of the year is from one direction in the day time and from a contrary direction at night, so that by starting a fire in the evening, the forest fire can be made to burn itself out, which is the best way to control its course on the day following. There is something conspicuously wanting in our Forest Reservation Inspection other than the item of salary.

MARKING PATENTED CLAIMS.

We have referred in former issues to the injury done to the country when our government deeds mining property to ranchers, or as grants, and in not retaining control of all minerals, for the future interests of the people. A graphite mining property, which is located on an old Mexican Grant, was purchased and operated by a company, came into the hands of a bank, which now holds it, and have not operated it since that time. A party chanced to see the property, and, not being aware that it was patented ground, made a mineral location on it in April last, and, in ignorance of the true condition of affairs, has operated it since that time. There being no notice on the property as to ownership, or fence or buildings, the mistake was easily made, although he made diligent inquiry in the district, and shows the necessity why all patented mining property should be marked by signboard, or fence, or in such a manner that no innocent party may lose his time and capital in developing that to which he cannot obtain the right to operate or perfect his title to it. Had the property remained in the hands of the government, his industry would have been encouraged and rewarded by granting him the right to work it, but the bank, with all its idle capital on hand, and still owning the claim, kept the development of the country back, through our having a dishonest system of mineral ownership by individuals and rich corporations, which do not in all cases act as the government would, if it owned the minerals, so as to operate in the interests of labor invested in working minerals.

Prospectors and miners are continually put to unnecessary expense, on account of the

careless system we work under, of allowing patented mines and mineral ground to remain without signboards or fences, in addition to the evidences of survey left by surveyors on such property, which survey posts and markings are to a large extent not understood, except by the miner and prospector of long experience, therefore there is urgent call for a better system of marking patented mines and claims.

WATER STORAGE RESERVOIRS.

To the mining interests of the west and southwest, the construction of large water storage reservoirs by the Federal Government at suitable places in the mountains is as important a piece of work to this industry as is the building of harbors to the sea coast and shipping interests. It is a matter of national importance in rendering the country fit for habitation, and therefore strictly within the sphere of the government to undertake, as it has been so considered by the government in Australia under similar climatic conditions to ours. Our government has already made exhaustive surveys of such locations through the efforts of the staff of the Geological Survey, and it is highly desirable that this excellent work should become available for irrigation and mining use at as early a date as possible. The next Irrigation Congress is to be held at Cheyenne, Wyoming, on the 1st and 3rd of September, when this matter ought to be made the chief topic for discussion and action, so as to have government aid in the work at as early a date as possible. As large a delegation as possible is necessary from all sections of the country. The mayor of every city of less than 25,000 can appoint one delegate, and of over 25,000 two delegates. Each commercial body, irrigation, agricultural and horticultural society and irrigation company is entitled to one delegate.

The year 1898 is bidding fair to be the banner year for water development in the southwest, but the extent to which the large storage reservoirs can be built with Federal aid would far surpass it, and it is the duty of all citizens to do all in their power to help the cause along, if for no other cause than that of furthering their own best interests. No public movement can aid the development of the west to such an extent as this necessary measure.

IN PROCESS OF SOLUTION.

Events are solving the money problem more rapidly than is generally supposed. The apparent necessity for the gold standard is disappearing, as is also that of retiring the greenbacks and treasury notes.

For several years trade balances were adverse to this country, which depleted our gold reserves, and as when greenbacks were redeemed, they could be and were put out again, their redemption and reissue constituted what was termed an "endless chain," and the demand for gold, to pay foreign indebtedness imposed an embarrassment and burden upon the government. The demand for gold threatened to force it to a premium, which would embarrass business as well as government. It was thought, too, that giving silver an equal status with gold, as a medium of exchange in domestic transactions, would be invidious, as the demand for gold would carry it to a premium, and would make silver, even in domestic trade, an inferior money.

In the last fiscal year, the balance of trade

in our favor was \$600,000,000, which enabled our people to pay interest on bonds on foreign investments in this country, or, in other words, has caused the tide of gold to run heavily our way, which is not only deplorable of the gold resources of foreign countries but removes the demand for gold in this country. While, as a rule, we have exported more agricultural products than we have imported, and that condition is likely to continue, we have during the last fiscal year exported manufactures in excess of imports to the extent of \$40,000,000, which presages a certainty that hereafter trade balances will be on our side at all times, except when conditions are very exceptional, and such conditions are not likely to occur.

Continual depletion of the gold resources of foreign countries, if it continue to any great extent, will force them to adopt an additional standard, which will naturally be that of silver, so long as the circulating medium rests upon a metallic basis. The gold of the world, devoted to monetary uses, is put down at \$4,000,000,000, and should we withdraw from the European stock but \$100,000,000 per annum, there would be left no gold in the vaults of European banks and treasuries at the end of thirty years, and should our balances of last year keep up for five years, Europe would have no gold except in ornaments, and gold would soon be so plentiful in this country that there would be no object in making it the sole measure of value. The energy with which the gold standard has been urged was stimulated by the opportunity which existed to make it especially advantageous to its possessors. That opportunity has passed away, or, at least, is rapidly passing away.

Our customs duties and internal taxes are all payable at the option of the payers in any kind of our circulating medium, and, hence, there is no demand for gold for these purposes, so that hereafter it is improbable that legislation in favor of gold will be sought. Gold is nowhere a money of large circulation outside of California, and its extensive use here is partly from local sentiment, and partly because other kinds of money have not been plentiful. Gold never was intended for general circulation, for it is too scarce, and, consequently, too valuable to be worn out by continuous handling.

Though in the course of international trade we seem determined to draw money from Europe in considerable sums, it will be a long time, if ever, before our stock will be so great that it will answer for the sole metallic base for such a volume of paper money as the country will need. It will take a considerable sum annually to meet interest and dividends due to foreigners, and to pay the expenses of American tourists abroad; but we have reached a state which seems destined to continue, when gold can not have such a value as will stimulate exertions to make it a standard to the exclusion of silver, that is to say, there will be no such condition that will force it to a premium, if its functions in our domestic commerce are not made greater by law than those of other kinds of money.

Lindheim & Co. have decided to put in a modern quicksilver furnace at their mine, at Agua Frio, Brewster county, Texas, and abandon the retorts now in use, and which have turned out 4000 pounds of the metal.

"Your JOURNAL is a Dandy!"; so writes a prominent mine owner of Sabinal, Mexico, to the MINING AND METALLURGICAL JOURNAL.

Patents.

Messrs. Townsend Bros., solicitors of patents, Los Angeles, California, report the following recent patents of interest to mining men:

August 2nd. Steam ore stamp, two patents, David Cole, Chicago, Ills., assignor to Gates Iron Works of Illinois. These inventions relate to means whereby high pressure is admitted beneath the pistons, low pressure is admitted above the pistons, and each low pressure chamber is exhausted when its respective piston nearly reaches its lowest position.

July 26th. Hose attaching device for rock drills, P. H. Hearndon, San Francisco. A bent stop-cock, having at one end round non-angular screw threads raised above its surface, and a compression clamp adapted to surround the hose adjacent to the threads. The round threads prevent the hose from being cut, but allow the nozzle to be screwed tightly into the hose to thereby prevent leakage of air.

July 26th. Process of producing magnetic oxide of iron, R. H. Peak, Orlando, Florida. Finely pulverized dry ferric oxide is heated to a temperature somewhat below its fusing point, constantly agitated for some time, the air being excluded, and is then allowed to cool in its own gases while the air is excluded.

July 26th. Magnetic ore separator, G. J. Crean, Montreal, Canada. A wheel with a thin, projecting, non-magnetic rim is arranged to revolve on a shaft; stationary magnets are arranged inside of the rim, extending on one side from the mid line of the wheel to the bottom. A hopper is arranged to feed the ore against the outside of the rim at a point near the upper end of the line of magnets, the iron being held to the rim by the magnets, the weight of the iron causing the wheel to revolve; the non magnetic ore falls into one hopper, while the iron is carried down to the end of the line of magnets and drops into another hopper.

July 26th. Process of treating complex ores, John Armstrong, London, England. The process of treating rebellious sulphide ores or mattes, which consists in heating them by a reducing flame to a red heat with a mixture of carbon and alkali, salt and lime—in proportion to form alkali metal, thereby effecting the reduction of the ore by the nascent alkali metal and tapping out the metal.

July 19th. Ore car, Geo. E. Truax, Denver. The invention consists essentially in providing a plate having an annular boss, through which passes the bolt, which fastens to the car the lever which locks the door shut, so that the lever is thus fulcrumed on the boss instead of the bolt.

July 19th. Crushing machine, T. L. Sturtevant, Quincy, and T. J. Sturtevant, Framingham, Mass. A rock breaker having an adjustable tension behind one of the jaws, so that when the pressure exceeds a certain predetermined amount, the tension will yield to avoid injury to the machine.

July 19th. Sizing machine for gold or like metals, Wm. Gray, Lincoln, Nebraska. A sizing machine comprising a box having discharge openings in front and rear, and a series of reversely inclined screens and pans, said screens having successively elongated meshes and discharging through the openings in front and rear into independent receptacles, handle bars extending front and rear, and flexible supporting legs, adapted to allow the box to be shaken sidewise.

July 19th. Hydraulic separator for treat-

ing mixed minerals, W. L. Lockhard, London, England, assignor to the Automatic Gem and Gold Separator Syndicate, (Limited), same place. A hopper feeds the wet material onto a cone, which spreads it out and delivers it to an annular trough, having a discharge beneath and inside the cone: by means of a current of water the lighter material is discharged over the top of the trough, while the heavy particles pass downward into locked receptacles.

The latest thing out is the publication of *El Boletín Comercial*, the organ of the Latin-American Club of St. Louis, Mo., and Foreign Trade Association. It is a monthly journal of twelve pages, and from appearances of the first number is phenomenally well supported, having representative manufacturing interests as its supporters. *The Commercial Bulletin* is entirely in Spanish, and contains an excellent selection of news items.

In their salutatory, *The Boletín Comercial* says:

"Al publicar hoy nuestro primer número de *El Boletín Comercial*, lo hacemos con el cordial deseo de que se estrechen cada vez mas las relaciones comerciales entre St. Louis y la América Latina. La experiencia que hasta aquí han tenido nuestros comerciantes con México, la América Central, Colombia y Venezuela ha sido del mas satisfactorio carácter y muy justo es que mencionemos el elevado tono del honor comercial existente entre los comerciantes de esos países nuestros vecinos del Sur."

Reynolds' Hand Book of Mining Laws of the United States and Canada, pertaining to Alaska, The Yukon District, British Columbia and Ontario has just been published by the W. B. Conkey Company of Chicago and New York. It is a very neat pocket edition of 360 pages, well bound in cloth, flexible covers, and is beautifully printed. Mr. Joseph Ward Reynolds, the author, is a barrister of renown, and has a large practice at the Minnesota Bar. Where there is conflict of authority upon any question, he has not hesitated to state what he regards as the correct principle. In short, it was endeavored to make this work a safe and reliable guide to the one interested or expected to be interested in mines or mining in the United States or Canada, and especially in Alaska, Northwest Territories, British Columbia and Ontario. No miner should be without a copy of it.

The advance in the price of lead, due to the duty on lead ores imported from foreign countries, has materially benefited our lead producers. The price of lead prior to the present tariff regulation was averaging in the neighborhood of \$2.75 per cwt., whereas today lead is about \$3.50 per cwt., and will probably reach \$4 per cwt. in the near future. With this difference of \$15 a ton, or upwards, it naturally means a great deal of encouragement to our lead producers. It also materially affects the large lead productions of Idaho and Utah, as most of these ores are smelted in Colorado, thereby benefiting our local institutions.

The Tramway mine, in Butte, Mont., adjoins the Snohomish, and which passed into the possession of F. Aug. Heinze some time ago, has been leased to Mike Nuenan, who will sink 100 feet additional on the mine under the terms of his lease. The property has never been developed to any extent.

SYSTEM IN THE LOCATION OF MINING DISTRICTS.

THEO. F. VAN WAGENEN, E. M.

I desire, through the medium of the JOURNAL to call attention to some interesting facts as to the relative situation of those localities in the Western United States where metalliferous ores occur, and to that end have prepared the accompanying map, which covers the country from about the 102° west longitude to the Pacific. This area embraces all the distinctive mining states and territories and the region of the Black Hills in South Dakota. A vast amount of detail usually found on maps, such as minor political subdivisions, commercial towns, parallels of latitude and longitude, names, etc., has been omitted, so as to display more clearly the drainage system and the mining districts; and it is believed that both of the latter features are shown with as great accuracy as possible upon a map of such small scale. The writer has partially completed maps of each State upon a much larger scale, showing the same features in greater detail and with more accuracy.

It will at once be observed that the mining localities are not scattered irregularly over the country, but are situated along ten belts, all of which have a general N. E. and S. W. trend, are roughly parallel to each other, traverse the region between the plains and the ocean like gigantic lodes and are separated by barren areas quite as extensive as, if not larger than themselves. [As a genuine effort has been made to locate all the mining districts of the West (though less than half are marked on the present map) these barren localities are really barren, and are not merely unprospected or unprofitable. I may also add that the investigation has been pushed some distance into both British Columbia and Mexico, with the result that so far each belt of rich and barren territory continues in the same line. In Central Nevada there appears a short and narrow belt between the two adjacent ones, which may properly be regarded as a connection, and around the mouth of the Colorado River two belts appear to unite.

Although all these great lodes (if they may be so considered) are approximately parallel, yet when No. 1 in the northwest is compared with No. 10 in the southeast, a distinct divergence is apparent; and if the central line of each be considered its course, the conclusion is that each lode departs more from a true N. and S. line than its neighbor to the eastward, and finally that all follow in a general way the curves of the lines of magnetic variation. I am of the opinion that when the problem is

thoroughly worked out it will be found that the axes of all will be identical with mean magnetic curves.

The subject of mineral belts is not a new one. R. W. Raymond, Clarence King, J. F. Kemp and several others have at different times called attention to the phenomena in various ways, but I am not aware that any have mapped them along the courses here shown, or suggested their possible connection with terrestrial earth currents. The mere fact of approximate parallelism is simply graphically interesting, but if their coincidence with the curves of magnetic variation can be clearly and unmistakably proven, it

archean, metamorphic and eruptive rocks (in which it is generally assumed metalliferous deposits occur) that are wholly free from ores; while within their limits not only are these rocks well impregnated, but the mineralization in many places has extended to limestones and sandstones of very recent age.

2. That the mineralization and fissuring of the earth's crust has not been connected with, and is not one of the results of, the elevation of mountain ranges. For the facts appear that the lines of fissure cross the lines of divides at all conceivable angles. To make this clear, the continental divide is strongly displayed on the maps by two parallel broken

lines with one continuous and lighter line between, and all other high ranges by one broken and one continuous line, while the subsidiary divides are marked only with the fainter continuous line.

3. That mineralization is an older phenomenon than mountain range formations, as might naturally be expected if it has any connection with the curves of magnetic variation. For, where the lines of fissuring are locally approximately parallel with the crest of a prominent divide the axis of the belt is visibly flexed. This feature is clearly shown at a number of points upon the large scale maps in progress in the writer's office.

4. Certain localities apparently promising, but outside of the belts, may be definitely abandoned by the prospector; while others within their limits should receive more careful investigation, even though surface indications are not attractive. For, if there are definite and continuous lines of fissuring and mineralization, these will at places be covered by rock or alluvial formations of recent date, or capped by volcanic overflows, and yet be sometimes accessible artificially or through deep erosion. An instance of this latter condition is found in parts of the Canyon of the Colorado, which

cuts for over 100 miles through the course of Belt 6.

The writer hopes gradually to be able to complete his more detailed maps, and to call (attention with their aid) to certain peculiarities of mineralization or rather metallization in some of the Belts, which are at least interesting, and which may have some bearing on the genesis of ore deposits in general.



MAP OF THE LOCATION OF THE PRINCIPAL MINING DISTRICTS IN THE WESTERN UNITED STATES.

would not only be highly probable that electrical energy in one form or another has had much to do with the deposition of metalliferous ores, but it would be a fair conclusion that in the region of the Magnetic Pole on the north shore of Hudson Bay, where the belts converge, excessive mineralization exists. Further, if system in the fissuring of the earth's crust by mineral veins is clearly shown in the Western United States, the same system will most certainly be found all over the globe.

So far as the present showing goes, some economical conclusions seem to be warranted, which can be briefly stated as follows:

1. That geological formations do not necessarily constitute a guide to probable mineral deposits. For, between the mineralized zones shown on the map are vast areas of

ONTARIO MINING COMPANY.

The Ontario group of claims is located about twelve miles southeast from Elliston, Deer Lodge county, Montana, on the N. P. R. R. near the head of one of the tributaries of the Little Blackfoot; but so near the summit of the great continental divide that Rimini in Lewis and Clarke county, on a tributary of the Missouri, and the terminus of a branch of the N. P. R. R., is less than seven miles distant. These mines are in the very heart of the most prolific mineral region of the country, surrounded by abundance of timbers for building, mining and fuel, and ample water is at hand.

William Dyer, the president of the company and the principal stockholder, was one of the original discoverers and locators of these mines in the summer of 1886. The first carload of ore from the Ontario mine was shipped October 1st, 1889, to the U. S. Sampling Works in Helena and netted \$1,556. From that time down to August, 1891, only twenty-four carloads of ore came from the mine, owing to disagreements and legal proceedings between the joint owners—which were settled by Mr. Dyer buying out the interest of his joint-owners for \$60,000, which has been paid from the earnings of the mine as fast as the notes become due. Since Mr. Dyer became sole owner down to the organization of the company, he had shipped 157 carloads of ore to various smelters at East Helena, Butte, Great Falls and Tacoma, to the gross value of \$149,485 87, and giving net proceeds of \$110,660 02, though working at a disadvantage and having extravagant charges for hauling to the railroad.

COLVILLE RESERVATION.

This district has reached a more advanced stage of development, and produced more ore than any other silver district in Washington. It forms the southern half of a belt extending

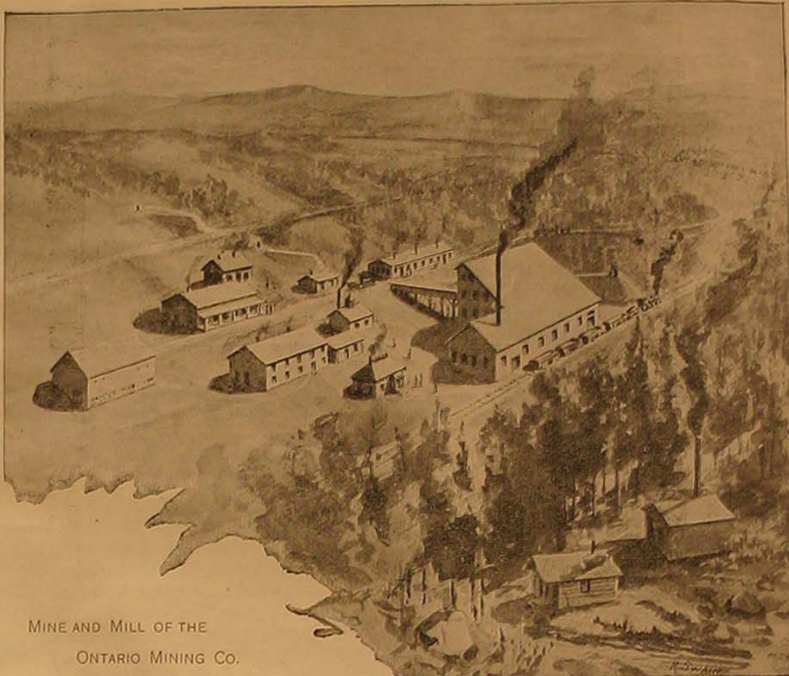
about ten miles east from the head-waters of Cedar and Deepcreek which waters empty into the Pend d'Oreille River near the boundary, southward for seventy-five miles, terminating in that direction in the Cedar Canyon District.

Like all other pioneer discoveries, it has had its alternate periods of activity and torpor, and now appears to have become the scene of renewed development, in sympathy with the movement generally prevalent throughout the Pacific Northwest.

The formation of this belt of country is granite, lime, slate and quartzite, and is veined with a belt of bodies of silver-lead ores, running sometimes north and south and other times east and west. These occur either in contacts between granite and lime, slate and lime, or slate and quartzite, or in fissures in the slate or lime. Where they occur in the lime formation the ledges show a good deal of surface disturbance, but at depth settle into permanent bodies of ore, either in chutes or veins. In the slate formation the ledges are almost invariably in place.

The first discovery was made in 1883 at the Embury camp, two miles east of Chewellah, by a party of prospectors sent out by John N. Squire of Spokane. The ore in that section carries galena, sulphide of silver, some carbonate of lead and chloride of silver, mixed with iron and copper pyrites. A rush of prospectors followed within two years, and explorations extended northward. Thus followed the discovery of the Old Dominion, seven miles from Colville, where the ledge is a contact between granite and lime, the ore carrying bromide, chloride and sulphide of silver, with occasional bunches of galena.

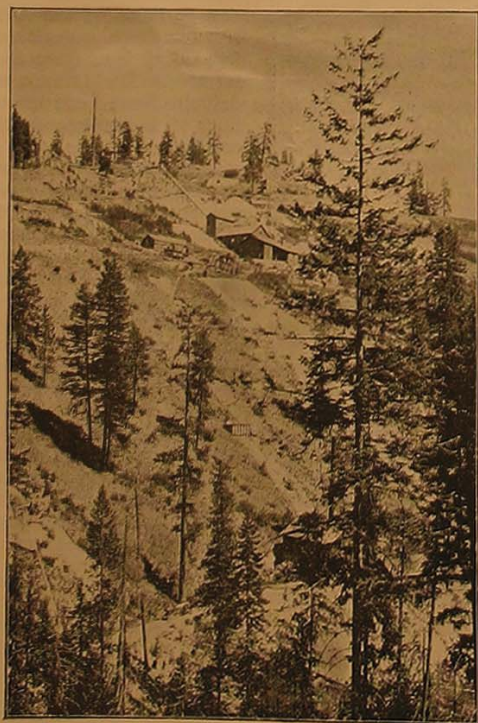
Then followed the discoveries at the head of Deep Creek and Cedar Creek, and along the range east of the Columbia to Little Dalles, this territory being included in the Northport district. Fifteen miles further south, in the Young America at Bossburg, the ore is lead and silver entirely. Five miles further southeast, in the Big Bonanza, we find a heavy mixture of galena and iron pyrites, carrying about 40 per cent. lead and ten ounces silver. Still traveling southward, we come to Gold Hill two miles east of Marcus, where the ore is copper pyrites carrying gold. On



Rocky Mountain, five miles more to the south, there is a great quantity of gray copper ore, but it is very much broken and no solid bodies have yet been found. Going fifteen miles onward to the south, we come to the Summit camp, where the ore carries galena and lead carbonates, and five miles to the southwest of this camp is the Wellington, with the same class of ore. Five miles south of this is the Cleveland mine, where the ore is galena, carrying about 40 ounces silver. All the ores of this belt are high grade, except those of Deep Creek, where they carry from 25 to 40 ounces silver and 40 per cent. lead.

The best developed and most productive mine in this belt is the Old Dominion, which embraces a group of claims covering the whole mountain and which is owned by the Old Dominion Mining and Concentrating Co. It is reached from Spokane by the Spokane Falls & Northern Railroad to Colville, 88 miles, whence a wagon road leads to the mine seven miles distant. The ore chute crops on the surface to a length of 400 feet in the contact between lime and granite, and in chambers 40 to 50 feet wide. The mine was first developed near the surface by a series of tunnels aggregating 3000 feet in length, attaining a depth of 250 feet. A tunnel was then driven 3,000 feet on the contact at a further depth of 400 feet and at the end of that distance struck a chamber of ore, which is now being developed. A cross cut has also been started and has opened other small veins, ranging from six inches to twelve feet. The ore carries bromide, chloride and sulphide of silver, with some native silver, and its contents range from 25 to 125 ounces silver, with 30 per cent. lead and \$3 gold. There is on the ground a concentrator with a capacity of 70 tons a day to treat the low-grade ore. The smelter returns show that about \$2,072,000 has been taken out of the mine and when shipping regularly, it produces about \$16,000 a month gross, or \$12,000 net, employing seventy-five men.

We present herewith a good view of this valuable property.



OLD DOMINION MINING AND CONCENTRATING CO.'S PROPERTY
COLVILLE, WASH.

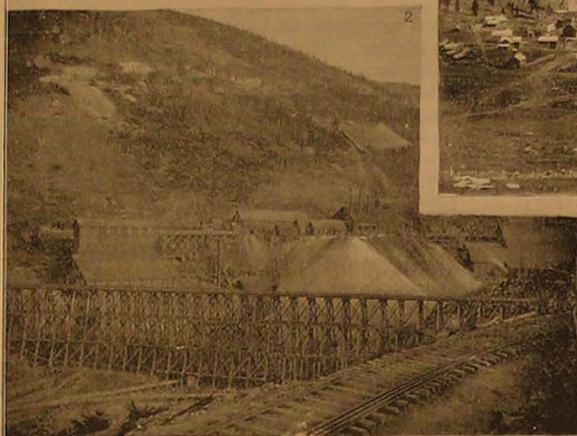
MARYSVILLE, MONTANA.

About twenty miles from Helena is located the Marysville Mining District in which is situated in the town of Marysville. Marysville is surrounded by some of the greatest mines and mining districts of any camp in Montana.

DRUM LUMMON.

Here is located the celebrated Drum Lummon property owned by the Montana Company, limited, the principal office of which is in London, Eng., E. C. The officers are Stewart Pixley, chairman; Thos. Neal, secretary; Geo. H. Robinson, manager. The company is capitalized at \$3,300,000; = 660,000 shares at a par value of \$5, and is non-assessable. It has paid regular dividends of \$0.525 per share, making a total of \$2,997,557 paid up to and including May, 1898. The mineral produced by this famous mine is gold and silver and is refractory, 85,000 tons having been the output. Steam and electricity constituted the power to run the two mills, one a 110-stamp mill, the other a cyanide plant of 400 tons capacity. The property is developed by tunnels and shafts and employs about 300 men. James H. Henley is the superintendent.

The Drum Lummon is one of the best developed mines in the state and the work of the



VIEW OF MARYSVILLE, MONTANA, AND DRUM LUMMON MINE AND MILL.

last year indicates from the new finds of gold-bearing veins that it will be for years to come a source of profit to its owners.

EMPIRE MILL.

Nearly 500,000 have been expended on the Empire mine and mill, making one of the best equipped properties in Montana. The mill, as will be seen by the illustration, is of great size, containing as it does sixty stamps, some twenty Frue Vanners and three rock crushers. In 1886-87 under the management

of Mr. Sizer this property produced \$344,000.

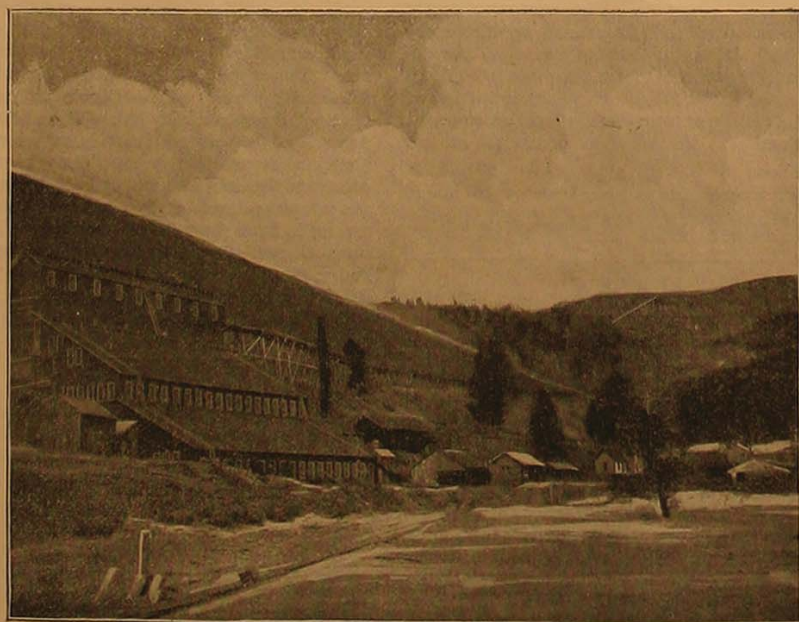
In April, 1894, the property passed into the possession of Samuel Word & Son. Previous to this time it was operated by an English company which built and operated nearly all the improvements now on the property.

In the same district are other good mines, among them the most noted being those of the St. Louis Mining Co. This company is largely composed of gentlemen residing in Helena, Montana, for whom the mines are named. It has several good properties and were it not that it is operating in the immediate vicinity of the famous Montana Company, limited, it would have much more prominence as a mineral producer than it has.

Marysville ores that would not pay to treat ten years ago are returning handsome dividends to the owners today, and it will no doubt be found that ores that are too low grade and refractory at this time will, five or ten years hence be worked with great profit. This will be due to the ever improving and much cheaper methods coming up all the while.

A New Belt Dressing.

There has been a growing demand among belt users for a more convenient form of belt dressing than the paste. The Joseph Dixon Crucible Company, Jersey City, N. J., are now placing on the market a solid belt dressing in round bars, about 8 inches long and 2 inches diameter. It makes a package convenient to the hand, and easy to apply even to fast-running belts. The company does not claim that the solid dressing is as good a preservative of the life and elasticity of the leather as the Dixon paste, but it is quick to apply and quick to act, and that is what is wanted by the general run of belt users.



EMPIRE MILL, (60-STAMP) NEAR MARYSVILLE.

CORRESPONDENCE

CALIFORNIA.

ACTON, CAL., Aug. 17, 1898.

EDITOR JOURNAL:—Will you kindly correct the statement made in your issue of 15th inst. in regard to the Red Rover mine.

I was sent here by the new management as superintendent of the mine, and neither I nor the company wish to have any extravagant reports go before the public. It can be of no possible benefit to us or the public at large. I cannot believe that Mr. Gilbert would make the statement that the mine shut down with ore in sight worth five or six thousand dollars per ton. We expect that the large body of ore will mill about six or seven dollars per ton, and that will leave us quite a margin for profit. Yours respectfully,

W. R. SHILLING.

NOTE: The statement above referred to was obtained from what we supposed to be a reliable source, but it evidently was not.—ACTING ED.

NEVADA.

SILVER PEAK, NEV., Aug. 5, '98.

EDITOR JOURNAL:—As I wrote you some time ago—about the Louis Chiatovich property—the mill would start, which it did, but only ran for a few days. Mr. Chiatovich crushed the rock dry, and tried to work it in the cyanide tanks, but could not save the values. He then crushed it wet and ran it over the plates, but that did not do the work.

The ore is evidently mixed with some mineral unknown to Mr. Chiatovich other than the lead quartz.

If satisfactory, arrangements can be made with the Selby Smelting and Lead Company of San Francisco. He will ship the ore there and have it treated by them.

Some of the ore will go over \$300 per ton. I. X. L.

UTAH.

SALT LAKE CITY, Aug. 12, 1898.

EDITOR JOURNAL:—The Utah mining stock market this week shows a decided broadening tendency. Some of the neglected silver stocks were conspicuously active and strong, while the regular investment stocks kept the pace fairly well in the advance.

Ajax quotations were unchanged, but there seems to be a better feeling prevailing in the stock, due, doubtless, to the encouraging nature of the developments now being made at the mine. It is not looked for any important change to occur until drifting is commenced from the new shaft, which is now nearing the 600 foot level. Features here are expected to be identical with those of the Mammoth, the adjoining mine, where extensive bodies of high-grade ore are found in the deeper levels. There are rumors to the effect that Alice will shortly declare a dividend of 5 cents per share, but it can not be verified. Anchor is being offered down.

Bullion Beck made a strong advance on the report that the smelter contract is practically closed. The mine is supposed to have \$75,000 worth of ore ready for immediate shipment. The regular dividend of 10 cents per share has been declared and will be paid on the 15th. There was no demand for Centen-

nial-Eureka, and odd lots of stock were offered rather freely.

Reports are that the Chloride Point ore is averaging per ton about 27 ounces of silver and 60 cents in gold, and that all the gold is being saved and about 70 per cent of the silver. If this is an accurate statement, the showing is creditable. The inside interests endeavored to bulge the stock today, and it sold up to \$1.07, but large blocks of stock were thrown on the market and the stock closed at .99½ bid and 1.01½ asked.

Dalton's assessment of ½ cent per share was delinquent August 10th. There was a vast discrepancy between the bid and the asking price of Dalton & Lark. Daly holds well and so does Daly-West. Dexter was a trifle higher. Shipments of crude ore, bullion and cyanides for the month of July amounted to about \$24,000. Geyser-Marion was in demand presumably on inside buying. Grand Central's weakness was hard to understand. The showing at the mine could not be better. It is understood that the mine earned \$28,000 in excess of the dividend for the month of July. The regular dividend of 12½ cents per share, or \$31,250 was paid on the 10th.

Mammoth was steady. The regular output is being maintained. Mercur was considerably stronger on investment buying. The regular dividend of 12½ cents per share was declared on the 9th, payable on the 20th. No definite information is being given out by the company as to what action will be taken relative to the new mill. Rumors were current that a strike had been made in Northern Light, but the effect was not observed in the price of the stock. There was an increased demand for Ontario. Omaha was in good demand. This stock ought to show considerable activity in the near future.

Sunbeam was very quiet. The Silver King dividend of 25 cents per share was paid on the 10th. Sacramento was stationary as to quotations. There seems to be a liberal supply of stock on the market. Sunshine quotations were unchanged. There is nothing to inspire trading at present. Swansea paid its dividend of 5 cents per share on the 10th. The stock was very strong and in demand. South Swansea holds up well. The regular dividend is expected to be paid this month. Utah was in demand. The company ought to resume dividend payments by the early autumn. Valeo, of Park City, was exceedingly active, on the report that Messrs. Keith & Kearns, of the Silver King, had purchased the controlling interest and would assume the management. Young America was in fair demand.

Miscellaneous Mining News.

ALASKA.

The steamer Oregon arrived at Departure Bay, last week, from Sitka direct, with over 100 passengers, the majority of whom were from the Copper River country or from Dawson. Her passengers declare that there are 3,000 people on the Valdez glacier at the present time, rushing out as fast as they can, and pursued by the phantom of starvation. If the government does not send aid to them—and that quickly—it is predicted that there will be great suffering, if not actual starvation, on the ice fields. The ice is melting fast; the streams are full and running over, it being extremely hazardous to cross them—yet, rather than stay and face the prospect of starvation, the erstwhile hopeful gold seekers

are risking everything. Men that went in with considerable money only a few months ago are now penniless, and cursing the day they ever heard of the Copper River country.—*Miner and Electrician.*

ARIZONA.

The King of Arizona Gold Mining Company, Colonel Epes Randolph president, is successfully operating a cyanide plant put in on the King of Arizona property, Yuma county, by the firm of Gardiner, Worthen & Goss, of Tucson, Ariz. The two blocks of gold, registering \$6,000, which were recently sent into Tucson, are mute but convincing proofs of the work done by eight men in fifteen days at the plant—a McArthur-Forrest patent.

Colin Timmons, a well known mining man of Yavapai county and Ferd. Nellis, of Williams, have bonded the Payroll, Champion and Twins mines of J. M. Murphy and J. J. Hawkins. The mines are among the richest lead properties of the county, and as the operators are thorough mining men, we may look for a consummation of the sale. A force of men have already been put to work.

CALIFORNIA.

AMADOR COUNTY.

The Keystone Company has shut down twenty stamps on account of the shortage of water. This has involved the discharge of thirty-five men. The Keystone uses water from the Blue Lakes Company.

The Kennedy mill has shut down, and a number of men have been discharged, on account of shortage of water. Steam power will be put in immediately.—*Amador Ledger.*

CALAVERAS COUNTY.

The San Justo mine, at Carson Hill, is an illustration of successful work, by good management, in working low-grade ores. This property was owned by Remington and associates of New York, who expended \$340,000 upon it, built a forty-stamp mill, chlorination works, fifteen-drill compressor and five houses. They operated two years, but the management was too high-grade for the low-grade ore. The mine was shut down and the shaft filled with water. Last December Dr. Flint, C. A. Hamilton and Senator Flint bought the property, unwatered it and retimbered the shaft to the 700-foot level. They have milled ore from the 200 foot and 300-foot levels and are opening levels at 600 and 700 feet. The ore mills from \$3.50 to \$4 per ton. The sulphurets run 5 per cent on the 600-foot level and yield about \$80 per ton. On the 700-foot level a mill run on 100 tons yielded \$14 per ton. The ore bodies are from thirty to eighty feet wide.

INYO COUNTY.

The first shipment of bullion, amounting to over 20 tons from the Darwin smelter went up on last Thursday's train. The smelter is running steadily and keeping a large number of teams busy.

KERN COUNTY.

The plant to be furnished by the Fulton Engine Co., of Los Angeles, for the Yellow Aster Mining and Milling Company, is to be one of the finest and most complete erected in the Randsburg country.

The 50-stamp mill and waterworks to be furnished will cost about \$75,000.

Work has been again resumed on the Little Butte Mine. The repairs to the engine were completed a few days ago, and the agreeable sound in a mining camp, of the dropping of the stamps in the mill, is heard night and day again.

The Jewell Iron Works and L. E. Porter, both of Los Angeles, are putting up a large cyanide process at Garlock to work tailings. It is estimated there are 10,000 tons of tailings there at the different mills, and probably \$100,000 will be taken out of them. The capacity of the works will be equal to 60 tons per day.

The Eureka mill people have their cyanide building completed and all the wood work in place and now only wait the arrival of the iron tank, which is expected tonight. On its arrival, they can be ready to operate in three or four days. The capacity of the plant is ten tons per day.—*Randsburg Miner*.

MONO COUNTY.

More bullion is being shipped from Bodie than from any other mining camp of its size in the country, and yet it doesn't appear that there is much going on, though the Standard Company steadily employs upward of one hundred men, and twice that number are employed elsewhere in the vicinity.

RIVERSIDE COUNTY.

A two-stamp prospecting mill is being placed upon the Adams Bros. & Pickett property in the south side of the Chucawalla range in Riverside county. This claim is a gold property recently developed, having a 50-foot shaft sunk upon a good strong ledge.

Fink, Conway & Robinson have also a good property in the immediate vicinity of the Adams Bros.' mine. There is a 90 foot shaft and several tunnels in on their property.

The Chucawalla Mining and Milling Co. have several good properties of which the Happy Jack is the principal mine in this section. Considerable development work has been done on these properties, showing a well defined ledge of gold-bearing ore.

SAN BERNARDINO COUNTY.

Few men are taking out ore in the Dale district, on account of the warm weather. The placers are not being worked at all. At least \$25,000 has been taken out by that method of mining in the last fifteen months.

Meatchem Bros. have struck water in the Dale district at a depth of 108 feet. They will at once begin the erection of a mill.

TUOLUMNE COUNTY.

The Homestake property, situated near Jacksonville, adjoining the Eagle-Shawmut mine on the south, has been incorporated under the name of the Homestake Gold Mining Company of Tuolumne, with a capitalization of \$250,000, with shares at \$1 each. The Homestake was located in 1866, and has been worked at various times ever since, \$20,000 being taken out from its surface workings. The formation is black mineralized slate. The directors of the company are: L. W. McGlauffin, president; I. N. Chapman, vice-president; William Burchett, secretary; Thos. Pozzer and William R. Pozzer. The principal place of business is San Francisco.—*Sonora Independent*.

COLORADO.

At the Barnes, on Quartz Hill, Gilpin county, which is being operated by Byron Lake & Son, stopes are being opened up in the 325 and 400 foot levels. This property continues to ship about fifty tons monthly of fair grade concentrating ore, the smelting ore being a small percentage of the whole output.

Manager Eby, of the Golden Cloud mine, in Russel gulch, Gilpin county, reports that drifting operations are being carried on in the 300 levels, and both mill and smelting ore is being taken out, and shipments will be commenced at an early date. The shaft on this property is 325 feet deep, and it is the intention of the operators to sink another lift in the near future.

The shipments of ore from Gilpin county for the month of July, over the Gulf railroad, aggregated 279 carloads, or 4,464 tons. The shipments for the same month of last year were 280 carloads, and the shipments show that the production of the county in this branch of the yield for the present year is keeping close to that of last year, which was one of the most prosperous in its history.

The Hap Hazard mine at Leadville, in which the latest gold strike was made, is turning out even better than was anticipated. There are now between twenty-five and thirty tons ready for shipment, which average three ounces to the ton in gold, and the tonnage from the property is being rapidly increased.

Victor Mines.

Keith and Grube, leasing on the Vindicator, have drifted on the ore chute a distance of about eight feet and are now operating for air from their 130 foot level. At present they are shipping at the rate of 10 tons per day of ore running from two to three ounces. When stoping is started, this lease will be good for at least 25 tons each day of this grade of ore, as both the quantity and quality of the mineral in the upraise are better than in the drift.

Carey & Howell, leasing on the Little May, on Beacon hill, are now getting out about five tons of medium grade ore each day. In the past two weeks they have shipped five carloads. The lowest ran a little over \$30 and the highest \$80.

A. M. Weare, leasing on the Whippoorwill, on Bull hill, is putting in a plant of machinery over his shaft. He claims to have two feet of ore at the 125-foot level that assays better than two ounces without sorting.—*The Mining Investor*.

IDAHO.

Seven Devils Copper Mines.

Garnet is the name of the camp and proposed postoffice of the famous Blue Jacket group of mines, which are being developed by the Blue Jacket Mining Company. The group is being developed in a manner that is a credit to Superintendent Ireton. His present showing, with only 40 days' development, excels the famous Peacock. The Queen mine, one of the group, has a shaft 45 feet deep, four by seven, that is in first class ore. Pieces of four and five hundred weight, of 70 per cent copper, is being extracted from the shaft. Superintendent Ireton says that, as soon as he can procure transportation, he

will ship a carload of ore to prove that the Blue Jacket lode is the richest copper lode in the known world. He says: "After I have done the development work the company intends doing, I will have copper in sight to pay the national debt at the present prices of copper." And any one that sees the present showing that is made will not doubt him in the least, for the Queen, King, and Blue Jacket No. 1 are growing larger and richer on every day's work. A tunnel is being run on the vein that will tap the last claim some 800 feet in depth. When the work is completed they will have a body of high-grade ore ready for extraction with an average width of 12 feet, 1,200 feet in length, and between 400 and 500 feet in depth. Every shaft drift and crosscut along this group bears witness to the above body, therefore we consider it a very conservative estimate of what the work will place in sight.

MICHIGAN.

The new D shaft, at the Lake Angeline mine, of the Pittsburg and Lake Angeline Mining Co., at Ishpeming, is in use, though as yet but little ore has been hoisted through it. The shaft house is about finished. The old or west end of the mine is nearly worked out, only one of the six skips being in use, and this one in C shaft will probably be abandoned by the close of the shipping season. The miners there are getting out pillars. There is a large amount of dead work under way, and a lot of exploration work has been under way some time with diamond drills. Superintendent Watson intends to transfer the crusher at C shaft bodily to the new shaft when C shaft is abandoned.

MINNESOTA.

The monthly report of the Sault Canal from Lake Superior shows that in July the canal beat all preceding records by nearly 300,000 tons, the largest month prior to July being June of this year, which was 19,000 tons larger than any earlier month. In this year, to August 1st, there have passed the canal going east 5,159,025 gross tons of iron ore, and in July 2,055,574 tons. This is 1,130,000 tons more than for the same three months last year, and 1,163,000 tons more than for the same time in 1896. So far this year the tonnage of iron ore has been about 60 per cent of the total. In all, 22,500,000 bushels of grain have been taken through and 1,825,000 tons of coal. The probabilities are that the present month will show a bigger tonnage of all commodities than did July.—*Engineering and Mining Journal*.

MISSOURI.

Col. T. J. Hart, of the Narragansett Mining Company, intends to replace his present pump with a 16x10x12 Snow duplex pump.

Top Run Mining Company is operating on town lots in the southwest part of Joplin, with a good steam concentrating plant that will handle 200 tubs of dirt every 9 hours. At present 12 men produce weekly about 6 tons of zinc ore and 20,000 lbs. of lead ore.

Vaughn & Company have two lots on the Empire Zinc Company's land, where they have a good steam concentrating plant that handles 200 tubs of dirt every 9 hours, and produces 20 tons of zinc ore weekly. They employ 10 men and use two steam drills, as their ground at 85 feet is very hard.

MONTANA.

R. A. Bell recently took a bond on the Winscott mine, two and a half miles from Helena. He has had six men at work only a few days, and will make a shipment of ore to East Helena during the week. Samples from the south dump assayed 4.32 ounces of gold, worth, at \$20 an ounce, \$86.40, and 5.9 ounces of silver, worth, at 59 cents an ounce, \$3.48, giving a total value of \$8.988 a ton.

The Winscott being within a short distance of Helena, its success will give encouragement to several other properties that have not been worked for sometime past, but which are in the same locality.—*Helena Independent*.

The Mammoth Gold Mining Company, of Coloma, Missoula county, has been attached by Larabie Bros., bankers of Deer Lodge, and W. B. Hosmer, of Boston, president of the company, for \$25,000. The Larabie Bros.' account is for an overdraft on their bank and Mr. Hosmer attaches for money he has advanced from time to time. The Mammoth mine, under the new company and under the management of A. B. Brown, has been running the past eighteen months, during which time \$100,000 have been sunk. Some money was made, but it and other money acquired from assessments was put into the property. The assets amount to the property, a hoisting plant and air compressor and five-stamp mill.

The big crushers at the Snow Shoe mill, near Libby, Flathead county, gave out the first of the week and caused an unavoidable shut down of that mill for a time. New crushers are on the way from the factory, but were delayed in transit and parties were immediately dispatched to Spokane to procure repairs in haste. The breakage will not cause any inconvenience except a loss of a few days' time.

NEW MEXICO.

Output of Hillsboro gold mines for the week ending Thursday, Aug. 11th, 1898, as reported for the *The Advocate*:

	Tons
Wicks.....	15
K. K.	10
Richmond.....	15
Snake Group.....	50
Opportunity.....	15
Sherman.....	5
Cincinnati.....	10
Trippe.....	25
Rex (silver-lead).....	5
Total	150

Total output since January 1, 1898.—4,780.

NEVADA.

A Rich Ledge.

H. H. McColley and Chas. McConnell are developing a mine near Willow Creek, Humboldt county, which gives promise of being a valuable property. The first work which they did on the mine was the sinking of a forty-five foot shaft on a ledge from ten to sixteen inches in width, the ore averaging sixty dollars in gold and two hundred ounces in silver to the ton.

Owing to the difficulty experienced in hoisting with a windlass at this place of work-

ing, they started another shaft at a distance of about 700 feet, and are down about twenty-five feet. The ledge is about the same size as that of the first shaft, but the ore assays much higher.—*Silver State*.

OREGON.

King Solomon Mine.

A syndicate of Montreal, Canada capitalists has just purchased the King Solomon mine, in the Bonanza district, and the new owners propose to expend from \$25,000 to \$30,000 in developing the property, having already a good force of miners at work in sinking operations.

The Baker City Sampling Works, of which Messrs. Kadish & French are the owners and operators, last week received eight carloads of concentrates from the La Bellevue mine. These concentrates will be tested and purchased by the above-named firm. The sampling works, which handle nearly the entire product of the mines of this section, prove a wonderful aid in upbuilding the city.—*Democrat*.

It is reported that a fine strike has occurred at the celebrated Virtue-Collateral mine. The new vein exposed is four feet wide, and gives every indication of carrying excellent gold value. The tunnel, which led to such a good body of ore, is something over 500 feet in length, and strikes the ledge about 200 feet below the surface of the hill. Some thirty miners are operating at present, and the force may be increased.

SOUTH DAKOTA.

W. E. Sharpe and associates are working a large force of men in Calamity gulch, on leases recently made on the Hattenbach, Black Diamond and Hermitage claims. The ore runs from \$7 to \$60. The cyanide plant, which the company is about to start up at Spearfish, will treat ore from this property. It is understood that the cyanide plant is nearly ready for work, there being delay on account of the non-arrival of a set of rollers.

The owners of the Harrison mine, north of Lead are being much encouraged over the prospects that are being opened up. The ore body has been drifted into about 35 feet, all in a high grade ore. A shipment of three cars is ready to be sent to Kansas City, which will average about \$70 a ton. A night shift is to be put on very soon and the capacity of the mine increased. The Durango property, adjoining the Harrison, is opening up very well. Three carloads were just shipped, one to the Deadwood cyanide plant and the other two to Kansas City.—*Black Hills Mining Review*.

UTAH.

South Swansea declared a dividend of five cents per share, payable on the 23rd.

Bullion-Beck paid its regular dividend of 10 cents per share, or \$10,000, on the 15th. This carries the total to \$2,515,000.

It is reported that Centennial-Eureka will build a mill to handle the low grade ores. It is estimated that the mill will cost \$150,000.

A decision in the Geyser-Marion case was handed down this week to the effect that a deed should be given to the plaintiff for a one-

half interest in the Geyser claim, and that an accounting must be made for one-half of the proceeds derived from the sale of ore extracted from this claim. The matter is a vexatious one, but not gravely serious. In the first place, the claim covers only six acres of ground, and will be owned jointly by the plaintiff in the case and the Geyser-Marion Company. The total ground holdings of the company cover about 100 acres, and a relinquishment of one half of six acres ought not to affect the value of the property to any great extent. In the accounting for ore extracted, the bulk seems to have been taken out by those working the property prior to the time that it was acquired by the Geyser-Marion Company. Legal advice on the subject is to the effect that if a settlement must be made it should be closed on the basis of a surrender of one-half interest in the Geyser claim and the payment of a sum probably not in excess of \$5,000 for ore extracted. For a round year, the Geyser-Marion Company has been forced to face a chapter of difficulties, "but it's a long lane that has no turning," and Geyser-Marion may yet prove to be all that its friends have claimed for it. The mine never looked better, and with the present difficulties removed the company will yet make a creditable record.

WASHINGTON.

Republic Camp.

The tonnage of Republic ore that is being freighted to Bossburg and loaded on the cars for shipment is gradually increasing. Louis Adams, who attends to the Republic Company's shipping at that place, reports that the last car of ore was loaded in three days, making an average daily shipment of about eight tons, or \$16,000 worth of ore.

The Deer Trail No. 2 Mining Company operating the property of that name in Stevens county, has declared its first dividend of one-half cent per share. It is expected that dividends will be monthly events from this time on, and that the size of the dividends will be materially increased in the near future.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

Le Roi Suit.

Senator George Turner and Colonel W. W. D. Turner have sued the British American Corporation and the Peyton faction of the Le Roi Company for \$780,000 damages, alleging conspiracy to depreciate the value of the Le Roi stock. The complaint sets forth all the facts concerning the Le Roi deal from its earliest inception, and tells of the wild flight of the trustees across the state to British Columbia, to evade service of court. Conspiracy and fraud are charged against the Le Roi stockholders, who want to sell their holdings to the B. A. C. and the big corporations, and its officers are also charged with fraud in endeavoring to obtain control of the mine. The chief argument in the case, however, is that it is unlawful and contrary to public policy for a foreign corporation to buy a majority or the control of the stock of a domestic corporation.

Ore Shipments.

The shipments of ore over the Kaslo & Slokan Railway, from August 4 to Aug. 10th inclusive, compiled for the *Kootenai*, were as follows:

MINE.	DESTINATION.	POUNDS.
Payne.....	Pueblo.....	300,000
Slocan Star.....	Pueblo.....	120,000
Last Chance.....	Pueblo.....	80,000
Ruth.....	Pueblo.....	40,000
Ruth.....	Everett.....	40,000
Whitewater.....	Everett.....	96,600
Coin.....	K. O. Co.....	13,000
Carbonate No. 3.....	K. O. Co.....	2,800

Total.....692,400 pounds or 346¼ tons.

LOWER CALIFORNIA.

Tom Peterson returned to Ensenada, Lower California, from the north last week, where he had been to secure a quartz mill. He decided on a Wiswall which is now being constructed, and which he expects to have in position on his San José property in a couple of months.

The Boleo (French) Copper Company of Lower California is putting up reduction works on another group of rich copper mines lower down the peninsula.

The copper bullion of the Santa Rosalia mines of Lower California carries \$60 gold to the ton and some silver and lead.

MEXICO.

The Big Four Company is putting an 80-stamp mill in at Las Planchas, Sonora, near Nogales.

The cyanide plant at La Colorado, Sonora, is to be doubled, the material for two large additional vats being already on the ground.

The Moctezuma Mining Company, operating in the district of that name in central eastern Sonora, is now employing 700 men and is preparing to erect a smelter.

Both the Cinco de Mayo mine, owned by Don Pancho Sandoval, Jesus Amparan and Antonio Castillo, and the Escondida, owned by Paul Ginther, J. H. Heatherly and Charles Beisswenger of El Paso, being situated three miles from Summit Station on the new Sierra Madre Railroad in Sonora, are still working in high grade ore.—*Southwest Bulletin*.

RECENT ADVANCES IN SILVER-LEAD SMELTING*

BY RICHARD TERHUNE.

While many of you have suffered greatly by the fiscal policy of the world in the demonetization of silver, there is much left that gives you hope; old processes are being improved and new ones arising, until it goes without saying that values and quantity having been established, some method of extraction can be depended upon.

There are "cyaniding," "chlorination," the so-called "combination process" of plates, vanners and pans, and, latest of all, "bromine extraction," offering much promise for treating coppery ores, if free from lime and yet too base for amalgamation. Then we have, which is the topic of this paper, the time-honored stack furnace process for silver-lead smelting, which took ores which all other methods gave up, asked few questions,

and paid the miners of Utah, in 1897, sixty-two and sixty-five, one hundred per cent of the New York value of the entire contents of each metal.

1897.—Net tons, ore, 25,048; pounds Pb., (lead), 12,676,669; ounces Ag., (silver) 785,317.2; ounces Au., (gold) 6,380,037; total cost, \$658,204.74; average cost per ton, net ore, \$26.27.

Figuring the above with New York market prices of 1897, silver, 59.8c. per ounce; lead, \$3.58 per 100 pounds, and gold at \$20.00 per ounce:

12,676,669 lbs. Pb. (lead), at	
\$3.58 per hundred.....	\$ 453,824.75
785,317.2 ozs. Ag. (silver) at	
59.8 cents an oz.....	469,619.68
6,380,037 ozs. Au. (gold) at	
\$20.00.....	127,600.74

Total New York value..... \$1,051,045.17

658,204.64 ÷ 1,051,045.17 = 62.65 per cent, New York value.

\$41.96 New York value, contents one ton, ore—1897.

In 1886, but 58 per cent of New York value of entire contents of one ton of ore was paid the Utah miner.

1886.—Net tons ore, 26,015; pounds Pb. (lead) 14,836,935; ounces Ag. (silver) 990,576.3; ounces Au. (gold) 2,319.6; total cost, \$1,803,320.27. Average cost per ton, net ore, \$38.57.

Figuring the above with New York market prices of 1886: Silver, 99 cents per oz.; lead, \$4.63 per hundred, and gold at \$20.00 per oz.

14,836,935 pounds Pb. (lead)	
at \$4.63 per hundred.....	\$ 686,959.09
990,576.3 ozs. Ag. (silver) at	
99 cents an ounce.....	980,670.53
2,319.6 ozs. Au. (gold) at	
\$20.00 an ounce.....	46,392.00

Total New York value..... \$1,714,012.62

1,003,320.27 ÷ 1,714,012.62 = 58 per cent of New York value paid.

\$65.84 New York value, contents 1 ton ore, 1886.

	New York Value of Contents.	Price Paid in Utah.	Margin.
1886.....	\$65.84	\$38.57	\$27.27
1897.....	41.96	26.27	15.69
Difference,...	\$23.88	\$12.30	\$11.58

Decline in prices of fuels and fluxes in 18 years:

Year.	Price of Coke.	Price of Iron Ore.	Price of Limestone.
1880	\$23.50	\$6.75	\$1.75
1898	9.75	4.35	1.00
	\$13.75	\$2.40	\$.75
	=58.5 p. ct. decline.	=35.5 p. ct. decline.	=42.8 p. ct. decline.

Decline in cost of coke, iron and limestone in eighteen years, 52.8 per cent.

Year 1880, price of coal, \$7.40
" 1898, " " 3.75

\$3.65 = 40.9 per cent decline.

PERCENTAGE COST OF ELEMENTS:

Year.	Coke.	Iron Ore.	Limestone.
1880.	66.3	27.5	6.2
1898.	66.3	23.9	9.8

From the above it is shown that coke is the expensive factor of our business; but, far as we are from attaining the theoretic effect of fuel in the blast furnace, we are nearer to it than the old Sheffield pot melting furnace for steel, which required two and one half tons coke to the ton of steel melted, equalling 1-70 the theoretic or calorific value of the fuel, or the coal-fired iron heating furnace, which used 1½ tons of coal to the ton of metal heated to 2900 degrees Fahrenheit, equalling 1-20 the theoretic effect of the fuel. In lead practice we exceed ⅓ the true calorific effect of the fuel, for we heat 2000 pounds of slag to 2000 degrees Fahrenheit with 517 pounds of coke, besides requiring of this fuel other functions.

The value of hot blast would be great to us, were it not for the necessity of solid carbon in the charge. This could not easily be reduced in quantity, and as it now affords the necessary heat and reducing power, the gains from the custom mills are so rare, and usually so unsuccessful, that smelting has proven a blessing to small miners, and the world over it has afforded them a certain and good market for one ton or ten tons of ore.

No other process than smelting extracts 100 per cent of your gold, and few extract as much silver. Under proper conditions, it can take any part of the earthy crust of our planet, turn it into a liquid slag and remove its values.

Follow in your imagination the complex charges of a lead blast furnace, often containing ore from 25 mines, and perhaps half as many districts, from its entry at the feed door to the discharge below of four well-defined new products: matte, speiss, bullion and slag, and you must concede a wonderful, if it is a commonplace process.

The improvements in silver-lead smelting in recent years have been along the following lines:

- The judicious location of plants.
- The introduction of steel buildings.
- The increased size of plants.
- The increased size of blast furnaces.
- The improved means of slag disposal and separation.
- Better sanitary conditions about works.
- Dispensing with heap roasting.
- Improved system of flue dust condensation.
- The use of automatic roasting furnaces.
- Improved crushing machinery.
- The bouqueting of fine ores and flue dust.
- Internal system of tramways.
- Better power plants.
- Improved rotary blowing machines.
- Better railway service.
- Chemical basis of ore purchase.
- Tendency to uniform systems of assaying.
- Improvement of men and service under eight-hour system.
- Piston blowers.

First move:—

Judicious location of plants, with reference to proper mixture and supply of ores and cheap and ample sources of good fuel and fluxes, due regard being had for the market for bullion; distances of unwise and often fraudulent location of boom plants, with their pernicious effects upon capital and communities and legitimate enterprise are becoming more and more rare, thanks to a vigilant and

*A paper read before the International Mining Congress, held in Salt Lake, Utah.

generally honest technical press, and as well to human experience.

Second move:—

The growing use of steel building purposes in metallizing, economical alike in insurance of premises, the stability of a business, and offering special freedom from anxiety, which must attend wooden structures for roasting and smelting purposes. The large plant, as the outgrowth of competition as in all other lines, has lowered sized charges, and made large contracts, with their attendant advantages, possible.

The large blast furnace has called for better structural work, in which arches with tension bolt chords have given place to the old type of cast iron deck plate, to sustain the brick superstructure, and stronger caissons to enclose the lead well or crucible; the best practice is to not attempt to resist a pressure that is almost infinite, to provide releasing bolts to let out these plates at the beginning of a run; solid steel plates under the lead emable are now replacing rivetted ones, thus preventing any possible leak of bullion; often twenty tons of bullion have been found under rivetted plates.

The cross section of blast furnaces at tuyeres doubled and feed floor, trebled in twenty years, while the height has in some instances been increased fifty per cent; the long rectangular form has almost entirely displaced the square or circular cross section. Twenty years ago, a tuyere area of 42 by 72 was almost general. Now 44 by 144 is employed. In that early day, thirty-six square area at feed floor was used; now, 108 square feet are common. Heights have risen from twelve to eighteen and twenty feet, but the practice now shows a downward tendency in this regard. As a compact column does not admit the blast, walls of blast furnace have reached a thickness of thirty-one inches at the mantel, giving greater durability, so as the better to resist expansion and retard radiation of heat.

(To be Continued.)

The Jeffrey Manufacturing Co. of Columbus, Ohio, have just completed their Sheet Metal Department, the most extensive in the west, especially equipped for the manufacture of Jeffrey Standard Elevator Buckets and Spiral Conveyers.

The Jeffrey Co.'s long practical experience in the past twenty years enable them to manufacture a superior class of material which has no equal in the markets of the world. Send for their revised quotations and complete catalogue.

MINING LAW.

All questions and disputes concerning mining law, if addressed to the JOURNAL, will be answered under this heading by F. M. JEFFERY, mining attorney of Los Angeles, Cal. The latest important court decisions on mining cases will also be given.

Questions and Answers.

(Q.)—What is the effect of the recent decision of the Supreme Court on extra lateral rights?

(A.)—The U. S. Circuit Court have held that where a vein crosses one end line and one side line of a lode claim, that the side line became the end line of the lode, and no extra-lateral rights existed on the claim. The decision of the Supreme Court, referred to in the above question, has changed the law on this subject. The court held that the side line does not become the end line when the vein crosses one end line and one side, but that it remains a side line and that a vein apexing within a claim situated as above may be followed on its dip outside of the side line.

(Q.)—Have I a right to enter an enclosed field of a squatter and search for minerals?

(A.)—Yes, unless he has entered the land in some way, either as mineral or agricultural land.

(Q.)—I am 22 years of age, and have been recently informed that certain real estate belonging to my father, who died twelve years ago, belongs to me. Can I commence suit to establish my rights, or has the statute of limitations run against me. Some have told me that five years after my father died my rights expired?

(A.)—You have five years after you came of age in which to commence suit. The statute did not run during your minority.

(Q.)—Can one who owns a mining claim, a part of which is on a piece of patented land, follow his vein across the line of the patented land and into the same, as long as he keeps within the original boundaries of his claim?

(A.)—Yes. All government patents now issued to agricultural land reserves the right of one who has a vein entering the land to follow the same into said land.

(Q.)—Does a tunnel located after a lode claim have a right of way through the lode claim on the regular line of its bore?

(A.)—This question has not yet been before the Supreme Court of the U. S. Very recently it was tried by the U. S. Circuit Court of Colorado, (Judge Hallett presiding, who is considered good authority on all questions of mining law) and he held, in the case of Portland Gold Mining Company vs. Uintah Tunnel Company, that an injunction would be issued to restrain a tunnel from entering the side line of a prior valid lode claim.

(Q.)—I am the owner of a piece of government land, to which the only accessible way leads over the land of another. I have been using this right of way for two years, and within the last three months I have opened up a quartz mine on my land. The owner of the land, across which I reach mine, now refuses to permit me to use the road over his land—what are my rights?

(A.)—The law gives you an easement across the land of another to reach and use your land for agricultural purposes, but you have no right to use it for mining purposes. If you wish to do so, you will have to purchase an easement from your neighbor for this purpose. If your land is not patented, you had better, if you have not already done so, locate your mine as a mineral claim, as your agricultural entry will not hold it.

(Q.)—I am executor of an estate that owns several mining claims that are unpatented. I am in doubt whether the same are real or personal property, and whether any suits that may be brought concerning them should be brought in the name of the executor or the heirs.

(A.)—The courts have held mining claims to be real estate, and, therefore, all suits brought or defended, where the title or possession are involved, should be in the name of the heirs and not the executor.

PERSONAL NEWS ITEMS

H. E. PEARSON, of Boston, president of the Boston-Newmarket Mining Company, has been visiting the company's property at Ward, Colo.

P. RYAN, manager, Crown Point Mining Company, Park City, Utah, has returned from the east to Salt Lake City.

L. W. HILLIKER, of the Yolo Mining Co., passed Nogales, en route to San Francisco, last week.

SEELEY W. MUDD, manager of the Small Hopes Consolidated Mining Company, who has been spending a six weeks' vacation in the New England States, has returned to Leadville, Colo.

F. N. GUILD, professor of mineralogy in the University of Arizona, at Tucson, Arizona, has returned home from his trip to California and British Columbia.

W. C. COOK, of the Santa Rosalia mine, returned from San Francisco, remaining en route at Nogales for a few days.

MAX HEBERLEIN, formerly of Butte, Mont., is at present general manager of the Tasmania Smelting Company, a concern that is erecting a 250-ton smelting plant, in the Zeehan-Dundas country, Tasmania.

THOS. J. HURLEY, of the Exploration Syndicate, left Silverton, Colo., for New York City last week, whence he goes to Mexico to examine mining properties. Thence he goes to London, England.

Last week the Santa Rosalia Mining Company, of Sonora, Mexico, shipped another carload of high-grade gold ore.

J. G. ALLYN, associate mining engineer of the firm of Mariner & Hoskins, of Chicago, Ill., is at present engaged in professional work in the San Juan County and the Cripple Creek district, Colorado.

J. P. EVANS, of the Colorado Iron Works Co., Denver, Colo., accompanied by his wife and daughter, sailed from San Francisco for Mexico last week.

CHRIS H. MEYER has bonded to George J. Troop, jr., a group of seven claims in the Patagonia district, Pima county, Arizona, for \$20,000.

WM. VAN SLOOTEN, mining engineer and metallurgist, has left New York to be absent in Sierra County, California, about two months. His trip is in the interest of New York capitalists, who propose to purchase at least two mines in that county.

DR. H. S. PRITCHETT, Superintendent U. S. Coast and Geodetic Survey, was in San Francisco last week, en route to the Hawaiian Islands, under direction of the Secretary of the Treasury, to look after the conditions of the surveys of the islands.

P. HOOK was in Nogales, Ariz., from the Cananea mountains, in Mexico, where he is developing a very promising mining property.

W. R. SHILLING, E. M., the well known mining engineer, assayer and metallurgist, has accepted the position of superintendent under the new management of the Red Rover mine, at Acton, Los Angeles Co., Cal.

MR. LOUIS FADE, chief chemist and director of the Roessler & Hasselacher Chemical Company, has just returned from a trip to Colorado and the Pacific Coast, in company with Mr. Louis Ruhl, the company's western sales agent.

GEORGE F. BEVERAGE, manager of El Urbabo Consolidated Mining Company, is developing the properties and doing excellent work. The mines are located about nine miles from Torres in Sonora, Mexico.

H. L. SWAIN, the Ibarra Mining Company's superintendent at Calmali, Lower California, accompanied by Mrs. Swain, is at present sojourning in San Francisco.

H. M. NESMITH, the geologist of Lone Grove, Llano County, Texas, is in quest of mineral from California, such as cinnabar, gold, silver, copper, etc., a variety for cabinet specimens. When advised of cost of same, he will remit charges at once.

OBITUARY.

JOSEPH GILBERT, a well known mining man and pioneer, died August 17, twenty-five miles from Guadalupe, Mexico. He was born in Augusta, Me., December 31, 1829, and came to California in 1851, where he was soon after married, and where he had mining interests for a number of years. He was one of the pioneers of Lander County, Nevada, where he was extensively engaged in stock-raising, and there, in 1876, he was elected to the office of County Treasurer.

In 1881, he disposed of his property in Nevada and came to California, where he was one of the Laguna Farming Company, which consisted of Messrs. Hammel, Denker and other well-known men in Los Angeles. He was superintendent of the ranch during the ten years' lease.

Since then he has taken an active interest in mining, and was one of the owners and the superintendent of the Red Rover mine at Acton, Los Angeles County, Calif.

to 23 per cent. sulphate of potash, \$8.55 @ \$8.80 for New York and Boston; \$8.90 @ \$9.15 for Norfolk, and Philadelphia; and \$9.05 @ \$9.30 for Charleston. Savannah, Wilmington, N. C., and New Orleans.

NITRATE OF SODA.

Spot nitrate is in ample supply and buyers have the upper hand for the present. We have again to quote a little lower price, \$1.50 @ \$1.55 per 100 lbs. for spot. The same figures are quoted for futures, in view of the quantities known to be afloat for New York.

FINANCIAL NOTES.

The statement of the United States Treasury, on Thursday, August 18th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Aug. 18	Changes.
Gold.....	\$169,403,689	\$1,325,561
Silver.....	10,678,178	D. 1,429,832
Legal Tenders.....	39,491,822	I. 3,486,477
Treasury Notes, etc.....	4,343,377	D. 29,833
Totals.....	\$265,008,336	I. \$13,361,773

Treasury deposits with national banks amounted to \$61,081,877, an increase of \$1,025,155 during this week.

There has been a steady gain in the cash balance of the Treasury from the proceeds of the new bonds. It is estimated that about \$125,000,000 has been received thus far from these bonds. At present bonds of \$500 or less are only being distributed to subscribers. Notices of allotment are, however, still going out for the larger amounts, but the bonds themselves will not be dispatched until the small bonds have been distributed.

Experiments are now being carried on by the United States Government to make coins of the smaller denominations out of an alloy of copper, zinc, ferromanganese and aluminum.

Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st, 1898, and for the years 1897 and 1896:

Month.	1898.	1897.	1896.
January.....	56.77	64.79	67.13
February.....	56.07	64.67	67.07
March.....	54.90	63.06	68.40
April.....	56.02	61.85	67.92
May.....	56.38	60.42	67.78
June.....	58.61	60.10	68.69
July.....	59.06	59.61	68.75
August.....	59.06	64.19	67.34
September.....	59.06	55.24	65.68
October.....	59.06	57.57	66.06
November.....	59.06	57.91	64.93
December.....	59.06	58.01	65.24
Year.....	59.79	67.73	

Average Prices of Metals per lb. in New York.

Month.	Copper.	Tin.	Lead.	Spelter.
January.....	10.99	13.87	3.65	3.96
February.....	11.28	14.08	3.71	4.04
March.....	11.95	14.38	3.72	4.25
April.....	12.14	14.60	3.63	4.26
May.....	12.00	14.52	3.64	4.27
June.....	11.89	15.22	3.82	4.27
July.....	11.63	15.60	3.95	4.66

Gold and Silver Exports and Imports.

At all United States ports, June, 1898, and years from January 1st, 1898 and 1897.

	Coin and Bullion Exp.	Imp.	In Ores Exp.	Imp.
Gold—				
June.....	\$ 375,539	\$ 3,184,774	\$.....	\$145,838
1898.....	6,048,560	99,244,751	73,441	2,639,043
1897.....	25,000,717	3,715,340	93,188	2,330,314
Silver—				
June.....	4,156,650	759,755	1,239,048
1898.....	24,392,928	3,202,116	113,599	9,276,271
1897.....	27,894,900	4,419,889	259,150	10,600,481

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

Exports of specie from San Francisco for the month of July were as follows:

	Gold	Silver	Total
To Hong Kong.....	\$5,370	\$1,500,818	\$1,506,188
To Honolulu.....	109,000	1,000	101,000
To Central America.....	7,900	7,900
To Mexico.....	500	500
To New York.....	2,148,568	203,588	2,352,156

Totals.....\$2,257,688 \$1,713,306 \$3,970,994
Totals, 1897, 1,187,187,140 1,330,809 2,517,949
The silver included \$365,088 in bars, \$1,534,218 in Mexican dollars, \$8,500 in Peruvian sols, and \$5,500 in United States coin. Of the gold \$2,253,638 was in coin and \$4,000 in bullion. All the gold bullion went to New York.

The gold exported for the week went to the West Indies and the silver went chiefly to London. Of the gold imported, \$1,484,283 came from Great Britain and \$121,650 from Germany: the balance, together with the silver, came from Central and South America and the West Indies.

Exports of quicksilver from San Francisco in July and the seven months of this year were as follows (in flasks of 76 1/2 lbs.):

	July	Seven months
To Mexico.....	101	2,867
To Central America.....	125	856
To New York.....	25	25
To British Columbia.....	3	100
To New Zealand.....	30

Totals.....229 3,872
Totals in 1897.....425 3,072

The total value of the seven months' exports was \$140,266 or \$30,127 more than for the corresponding period last year.

MINING STOCK MARKETS.

SAN FRANCISCO, CAL., Aug. 23d, 1898.

Mining stocks were dull and unchanged as usual.

The Welsbach Commercial Company has declared a quarterly dividend of 2 per cent. on its preferred stock, payable September 9.

The delinquent assessment sales of the Chollar and Belcher mining companies will be held today.

The official letter from the Sierra Nevada mine for the week says: Riley Tunnel during the week extracted 18 mining cars of ore from the sixth and seventh floors and deposited it in the ore-house at the mine. The average assay of samples taken from the face was gold, \$63.63; silver, 8.14 ounces per ton. Work on the

building at the old shaft is progressing as rapidly as possible. Have accumulated a quantity of ore and will mill it as soon as arrangements for so doing can be made. The south lateral drift was advanced 40 feet; total length 130 feet; face in quartz and porphyry of low assay value. 900-foot level—The north lateral drift has been advanced 10 feet; total length north from the Sierra Nevada shaft 686 feet; face in porphyry and gypsum.

In the Alta mine they are extracting ore from the 825-foot level. The assays are \$7 in gold and 3 ounces of silver per ton. The mill will start today.

Brunswick lode—Gould & Currie, Best & Belcher and Savage-Sutro tunnel level—The joint west cross-cut started at a point 194 feet north of the tunnel line in the north drift has been advanced 13 feet; total length, 77 feet; face of porphyry.

Chollar and Potosi—800-foot level—The main south drift has been advanced 15 feet and is now out 48 feet south of the Chollar north boundary; face in porphyry.

Occidental Con.—The weekly letter says: "From the stopes above the 550 level we have extracted and milled 80 tons of ore, of the average assay value of \$8.20 per ton, as per battery samples."

BOSTON, MASS., Aug. 18.

In sympathy with the general stock market we have had a most remarkable week in copper stocks, the highest recorded prices being in cases attained and large advances made in other stocks. To-day profit taking has been quite noticeable, and sharp declines recorded; yet on the whole the market holds well and closes at material advances compared with last week. Calumet & Hecla found \$600 a share an easy figure to reach, and closes without reaction. The fluctuations in Boston & Montana have been violent in the extreme. After an opening at \$213 the stock boomed at \$228, later declining to \$221 with a subsequent advance the same day to \$229 1/2, and gradually sagged off on profit taking to \$223 1/2 at the close. Osceola jumped from \$53 to \$59 1/2 and settled to \$56, with good buying on the decline. Centennial moved ahead to \$19 1/2 and closes strong. Old Dominion is steady at about \$27, after selling at \$29. A market advance was made in Tamarack, from \$163 to \$172, with reaction to \$167. Arnold is stronger at \$18 and Franklin moved up to \$14 1/2, which was at the close. Atlantic sold at \$28 1/2 @ \$29 1/2; Parrot at \$22 1/2. Baltic advanced to \$20, but dropped off again \$18, which is lower than last week. Tecumseh has been quite active, and is in demand at \$3 1/2 @ \$4. Humboldt sold at \$6 1/2. Alouez at \$4 1/2 and Ashbed at \$3. Quicksilver stocks are neglected. Gold stocks are more active at higher prices. Merced sharply advanced from \$6 to \$8, and closed at \$7 3/4. Victor sold unchanged at \$6 1/2. Pioneer is higher at \$5 1/2. Ysabel at \$5 @ 4 1/2, and Cochiti at \$10 @ \$9 1/2.

* WANTS *

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month will be charged. Advertisements not accepted for less than one month.

WANTED—Position as Assayer and Chemist; reference upon application. Address: MISSOURI, JOURNAL Office, Los Angeles, Cal.

WANTED, by a young experienced man, position as quartz mill man, one who can keep mill running. Address, A. E. CHARLESWORTH, LOCKFORD, CAL.

WANTED, by a young man, a position as Assayer, etc.; experienced, competent and has a good knowledge of all metallurgical operations. Good references. Address, T. K. JOURNAL OFFICE, Stimson Block, Los Angeles, Cal.

WANTED—Situation by Millman and Assayer; Wages reasonable; Good references. Address "H" JOURNAL OFFICE

EXPERIENCED Assayer and Cyanide operator desires engagement. The successful and economical treatment of slimy ore or tailings by cyanide a specialty. Address W. Y. WATSON, Ely, White Pine Co., Nev.

AN EDUCATED Chemist and Millman, thoroughly understands Milling, Chlorination and Cyanide Processes. Twelve years experience in Montana and Colorado, now open to an engagement. Moderate salary. Address: "Chemist" JOURNAL OFFICE, Los Angeles, Cal.

Mine Wanted

MINING MAN of experience will develop Gold property of merit for 1/2 interest, or will bond whole mine and develop. Correspondence with owners only. Give full particulars. Will give satisfactory references. Address P. O. Box 887, Los Angeles, Cal.

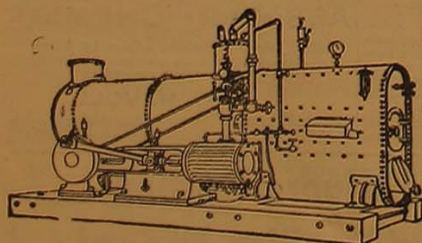
FOR SALE!

I HAVE some good gold mining properties for sale at reasonable prices, some developed and some real good properties at Ward, Eldora, Gold Hill, Jamestown, Magnesia, Caribon and Sugar Loaf. Write stating what you want or call on me. JAMES M. NORTH, Former County Judge, BOULDER, COLO.

A FINE Copper property in Mexico. A one-half interest in a good producing copper property will be given for required capital to do the necessary development work and placing machinery thereon. Substantial guarantee. Address "MINER," 1032 Mission St., San Francisco, Cal.

If you want mining machinery of the first class address the MINING and METALLURGICAL JOURNAL, stating the purpose to which it is to be applied, and you will be placed in communication with the leading manufacturers of repute. All the latest catalogues of mining machinery are kept constantly on hand.

The JOURNAL's advertising pages represent the cream of the trade, and nearly everything needed by miners, millmen and smelters can be found in them; in fact they constitute the best directory published in the West of mining machinery manufacturers.



Write for Catalogue and Prices.

RUSSELL & CO. PORTLAND, OREGON.

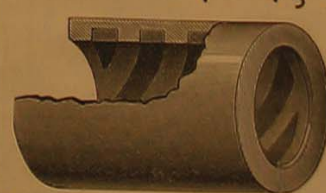
Chas. P. Grimwood,

Mining Engineer and Metallurgist

Laboratory, 214 Pine Street,

SAN FRANCISCO, CAL.

Oilless Bearings,



For

Rope Tramways, HOISTING Engines, Tackle Blocks, Cam Shafts in STAMP MILLS. A Practical BEARING that RUNS WITHOUT OIL. The Graphite Lubricating Company, BOUND BROOK, N.J.

ADOLF FRESE

ENGINEERING INSTRUMENTS

Barometers, Thermometers, Field Glasses, Microscopes and Accessories. Repairing Promptly Done.

126 S. Spring St., LOS ANGELES, CAL.

A. F. JUDSON, E.M.

Geologist and Mining Engineer,

Mines Examined and Reported on. COLTON, CALIFORNIA

A. A. WARREN

ASSAYER AND ANALYTICAL CHEMIST

COLTON, - CALIFORNIA

MINING STOCK QUOTATIONS

BOSTON	
Aetna Con.	do, rights 55
Allouez	3 38
Anaconda	do, rights 4 75
Arnold	16 88
Ash Red	3 88
Atlantic	23 00
Baltic	17 83
Bonanza	do, rights 75
Boston and C. C.	do, rights 28 00
Boston & Mont'a 21 11	do, rights 55 25
Butte & Boston	24 75
Calumet & Hecla	575 00
Catalpa	do, rights 118 1/4
Centennial	16 50
Dominion Coal	24 00
Dominion Pref.	16 3/4
Franklin	14 75

NEW YORK	
Alamo	03 1/2
Alice	40
Annetta	45
Best & Belcher	60
Brunswick	05
Bulwer	65
Crown Point	08 1/2
Con. Cal. & Va.	08 1/2
Cripple Creek Con.	08 1/2
Deadwood	11
Fortuna	25
Golden Fleece	45
Gould & Curry	45
Hale & Norcross	—

SAN FRANCISCO	
Alpha	10
Alta Con.	10
Andes	01
Belcher	23
Best & Belcher	26
Bodie	10
Bullion	10
Caledonia	52
Challenge	13
Chollar	19
Confidence	40
Con. Cal. & Va.	40
Crown Point	10

COLORADO SPRINGS STOCKS

Acacia	02 1/2
Alamo	02 1/2
American Con.	01 1/2
Anaconda	37
Argentum Juniata	20
Banner	00 1/2
Bob Lee	00 1/2
Creede & C. C.	04
Dante	01
Des Moines	01 1/2
Elkton Con.	98
El Paso	07 1/2
Emma Almee	003
Fanny R.	21
Favorite	02 1/2
Findley	05 1/2
Flower of the West	005
Franklin	003
Golden Crater	22
Golden Fleece	01 1/2
Gold & Globe	55
Gold King	55
Gould	03
Grass Hill	004
Hayden	004
Ingham Con.	04 1/2

SALT LAKE CITY

Alice	90
Ajax	34
Alliance	—
Anchor	17 1/2
Buckeye	02
Bull. Beck	8 20
Cent. Eureka	25
Chloride Point	38 1/2
Dalton	01
Daly	70
Daly West	4 20
Dalton & Lark	05
Dexter	1 20
Eagle	03
Eureka Hill	18 50
Four Aces	04 1/2
Galena	45
Gemini	2 50
Geyser-Matral	78 1/2
Grand Central	6 05
Homestake	09 1/2
Horn Silver	1 35
Little Pittsburg	02

ROSSLAND, BRITISH COLUMBIA.

Alberta	05
B. C. Gold King	07
Beaver	10
Big Three	10
Bluebird	07
Bruce	10
Butte	01 1/2
Caledonia Con.	05 1/2
California	15
Camp Bird	05
Celtic Queen	05
Centre Star	24
Colonna	18
Commander	12 1/2
Deer Park	12 1/2
Della Colla	02
Delaware	12
Eastern Star	20
Enterprise	20
Eric	03 1/2
Eureka Con.	05 1/2
Evening Star	08 1/2
Georgia	10 1/2
Gertrude	10 1/2
Golden Drip	15
Good Hope	03 1/2
Grand Price	03 1/2
Great Western	08
Hattie Brown	04
Helen	04
High Ore	04 1/2
Imperial	10
Iron Horse	20
Iron Mask	38
I. X. L.	10

DENVER STOCK REPORT.

Aetna	001
Anchorage Leland	87
Anaconda	37
Arcadia	01 1/2
Argentum Juniata	20
Banner	01
Bob Lee	01
Boston	01
El Paso G.	07 1/2
Enterprise	04 1/2
Fanny R.	21
Garfield Grouse	—
Geo. Washington	002
Golden Eagle	23
Gold Coin	36
Gilpin & C. C.	40
Gilpin Four	004 1/2
Golden Fleece	22
Isabella	23

IRON CLAD 02 1/2 WHEEL OF FORTUNE 002 1/2 JACK POT 03 1/2 WORK 02 1/2

MEXICO

Name of Company	State	Price
Allianza	Hidalgo	5
Amistad y Concordia	"	24
Angustias	Guanajuato	390
Araval y Anexas	Hidalgo	240
Asturiana y Anexas	Zacatecas	170
Barradon y Cabras	Durango	150
Barloome de Medina	Hidalgo	100
Cabezon y An.	Zacatecas	30
Candelaria de Pinos	"	160
Capuaya	Durango	120
Carmen	Hidalgo	400
Castellana y San Ram	Tepic	25
Cerro Colorado	Chihuahua	10
Cinco Senores y An.	Guanajuato	480
Concepcion y Anexas	S. Luis Potosi	100
El Oro	Guanajuato	40
Reparanza y An.	Mexico	1,300
Guadalupe	Guanajuato	180
Huautla	Santa Ana	100
Luz de Borda	Michoacan	40
Luz de Muravillas	Hidalgo	180
Pabellon	"	150
Palma	Zacatecas	100
Paraiso de los Com.	"	5
Real del Monte	Hidalgo	900
Refugio y Va.	"	8
Restauradora	Durango	60
San Francisco	Hidalgo	270
S. Ped. Chalchihuites	"	12
San Rafael y Anexas	"	925
do. Frae Stock	"	400
San Rafael del Oro	Hidalgo	20
S. Maria de la Paz	S. Luis Potosi	650
Sirena	Durango	50
Soledad	Hidalgo	500
Sorpresas	"	250
Trinidad	Guanajuato	40
Tlaxiingo	Hidalgo	27
Union	Hidalgo	280
Zomalahuan (gold)	Vera Cruz	180
Zona Min. de Pozos	Guanajuato	15

NOTE—The above Mexican stocks are figured on the basis of Mexican silver

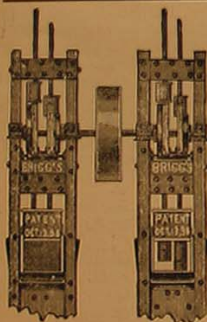
ORE TESTING

Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

RICKETTS & BANKS,
Metallurgists & Chemists

No. 104 JOHN STREET,

NEW YORK CITY

Krogh Manufacturing Company
Successor to San Francisco Tool Co.'s Machine & P'g Dept.MANUFACTURERS OF AND DEALERS IN
MINING AND PUMPING MACHINERY,
COMPRISING

Briggs' 2-Stamp Triple-Discharge Quartz Mill, of latest improved pattern, Rock Breakers, Ore Feeders, Concentrators, Engines and Boilers, Hoisting Rigs to be operated by Horse, Steam Power or any other motor; Ore Cars and Ore Buckets, Cornish and Jackhead Pumps, Triple-Acting Pumps, Centrifugal Sand and Gravel Pumps, Wooden Tanks and Pumps for the Cyanide Process, Pipe and Gate Valves, Link Chain Elevators for elevating and conveying all kinds of material. Estimates as to cost of machinery and its erection furnished upon application. Write for Catalogue and Prices.

OFFICE AND WORKS AT

51 Beale St. and 9 to 17 Stevenson St.,

San Francisco, Cal.

Assay Office *

LEW E. AUBURY

115 W. First St.,

Opp. Nat'k House

Los Angeles



BRANCH OFFICES:

1428 E St.,

SAN DIEGO, CAL.

523 1st AVENUE,

SPOKANE, WASH.

The Southern California Lumber Co., Stinson Bldg., Los Angeles, Cal., Chas. Wier Manager, sells

LUMBER

At Wholesale Prices

Mining Timbers a Specialty

Write for Price

FROM CRIPPLE CREEK

AIR COMPRESSORS,
ROCK DRILLS,
Stone Channelers,
The Pohle Air Lift Pump,
Coal Cutters,The Ingersoll-Sergeant Drill Co.,
HAYMEYER BUILD'G.
NEW YORK.

JAMES F. BURNS, Pres't. JOHN HARNAN, Gen. Man.

FRANK O. BECK, Sec'y and Treas.

THE PORTLAND GOLD MINING CO.,

(Stock Transfer Office, Colorado Springs.)

Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1898

The Ingersoll-Sergeant Drill Co.,

Gentlemen:—We bought two years ago one of the largest

size of the straight line type of Ingersoll-Sergeant Piston

Inlet Compressor.

This was found to be too small for our needs about a year

ago and we purchased of you a Duplex Corliss machine

16" x 18 1/2" x 42".

This was set in place in our shaft house in the Cripple Creek

District, 10,000 feet above the level of the sea, and has been

running continuously ever since, and at times over ten 3/4

Eclipse drills. The steam cylinders were connected to an In-

dependent Jet Condenser, for which we are using the mine

water, and the resultant economy of operation is very

noticeable.

The operation of this Compressor is as near perfect as

that of any machine we have ever seen, and this type is well

worth the extra cost on account of the great permanent

economy in operation.

Our mine is equipped exclusively with your drills and we

have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,

Jas. A. Burns, President

INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Mineral Produced
1	Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	July 1898	\$ 140,000	Q.
2	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	April 1898	3,475,000	G.
3	Alaska Mexican	Alaska	200,000	1,000,000	5	10	April 1898	297,031	G.
4	Alice	Montana	400,000	10,000,000	25	05	April 1898	1,075,000	G. S.
5	Alice	Utah	400,000	10,000,000	25	05	April 1898	1,075,000	S. L. G.
6	Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1898	6,750,000	C.
7	Anchoria Leland	Colorado	600,000	600,000	1	01	July 1898	144,000	G.
8	American Gold	Colorado	300,000	3,000,000	10	02	Mar 1898	291,000	G. S. L.
9	Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1898	780,000	S.
10	Bald Butte	Montana	250,000	250,000	1	03	Sept 1897	512,500	G. C. S.
11	Bangkok C-Bell	Colorado	600,000	600,000	1	01	July 1898	107,510	S. L. C.
12	Big Six	Colorado	500,000	500,000	1	00½	May 1898	15,000	G. S.
13	Boston & Montana	Montana	150,000	3,750,000	25	3 00	May 1898	7,625,000	G. C. S.
14	Bullion Beck and Champion	Utah	100,000	1,000,000	10	50	Mar 1897	2,485,000	G. S.
15	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	05	July 1898	495,000	S. L.
16	Cariboo	British Col.	800,000	800,000	1	02	May 1898	204,965	G.
17	Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	June 1898	53,850,000	C.
18	Centennial Eureka	Utah	30,000	1,500,000	50	1 00	Mar 1897	2,010,000	S. L.
19	Central Lead	Missouri	4,000	400,000	100	1 00	Apr 1898	40,000	L.
20	Charleston	South Car.	10,000	1,000,000	100	1 00	Feb 1897	150,000	
21	Champion	California	34,000	340,000	10	25	April 1898	298,200	G.
22	Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	5,000	G. S.
23	Colorado Sun	Montana	100,000	1,000,000	10	50	June 1898	1,595,000	G. S. C.
24	Crescent	Utah	24,000	600,000	25		July 1897	280,000	
25	Crowned King	Arizona	600,000	6,000,000	10	02	June 1898	160,000	G. S. L.
26	Daly	Utah	150,000	3,000,000	20	25	Mar 1897	2,925,000	S. L.
27	Deadwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,350,000	G.
28	De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,451,600	S. L.
29	Elkton Consolidated	Colorado	1,250,000	1,250,000	1	01½	July 1898	555,710	G. S.
30	El Paso	Colorado	650,000	650,000	1	01	Jan 1894	12,093	G. S.
31	Empire State	Idaho	75,000	750,000	10	10	June 1898	7,500	
32	Fern	British Col.	200,000	200,000	1	05	Jan 1898	10,000	
33	Florence	Montana	500,000	2,500,000	5	01	May 1897	132,530	S.
34	Geyser-Marion	Utah	300,000	1,500,000	5	02	May 1898	84,000	G.
35	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	June 1898	80,000	G.
36	Golden Cycle	Colorado	21,000	1,000,000	5	00½	June 1898	150,000	
37	Gold Coin	Colorado	200,000	1,000,000	5	05	Nov 1897	160,000	G. S.
38	Gold and Globe	Colorado	750,000	750,000	1	3-10	July 1897	51,625	G.
39	Golden Reward	S. Dakota		1,030,000	15		Feb 1894	155,000	G.
40	Hecla Consolidated	Montana	30,000	1,500,000	50	50	Feb 1897	2,175,000	S. G. L. C.
41	Helena & Frisco	Idaho	500,000	2,500,000	5	04	August 1896	475,000	S. L.
42	Highland	S. Dakota	100,000	10,000,000	100	20	June 1898	3,664,718	G.
43	Holy Terror	S. Dakota	300,000	300,000	1	03	July 1898	99,000	G.
44	Homestake	S. Dakota	125,000	12,500,000	100	50	June 1898	6,806,250	G.
45	Hope	Montana	100,000	1,000,000	10	10	Mar 1898	762,252	S.
46	Horn Silver	Utah	400,000	10,000,000	25	05	April 1898	5,120,000	S. L.
47	Idaho	British Col.	500,000	500,000	1	05	May 1898	264,000	
48	Iowa	Colorado	1,000,000	1,000,000	1	00½	June 1898	90,000	G.
49	Iron Mountain	Montana	500,000	5,000,000	10	1 00	Jan 1898	501,100	S.
50	Isabella	Colorado	2,250,000	2,250,000	1	00½	June 1897	270,000	G.
51	Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C.
52	Last Chance	British Col.	500,000	500,000	1	04	Jan 1897	42,000	S. L.
53	Le Roi	British Col.	500,000	2,500,000	5	10	Apr 1898	775,000	G.
54	Lillie	Colorado	1,000,000	1,000,000	1	01	July 1898	99,100	G.
55	Minnesota	Minnesota	165,000	16,500,000	100	1 50	July 1898	3,735,000	I.
56	Montana Ltd	Montana	680,000	3,300,000	5	05½	May 1898	2,997,557	G. S.
57	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	July 1898	760,000	
58	Morning Star	California	2,400	240,000	100	5 00	June 1898	666,600	G.
59	Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60,000	G.
60	Mercur	Utah	200,000	5,000,000	25	18	May 1898	1,066,000	G.
61	Mammoth	Utah	400,000	10,000,000	25	05	June 1898	1,250,000	G. S. C. L.
62	Moon Anchor Gold	Colorado	600,000	600,000	1	07½	July 1898	216,000	G.
63	New Elkhorn	Colorado	300,000	1,500,000	5	24	Sep. 1896	72,000	G.
64	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	July 1898	930,000	S. G.
65	Napa	California	100,000	700,000	7	20	July 1898	930,000	Q.
66	New Idria Quicksilver	California	100,000	500,000	5	10	July 1898	60,000	Q.
67	Ontario	Utah	150,000	15,000,000	100	75	Dec. 1897	13,542,500	S. L.
68	Osceola	Michigan	50,000	1,250,000	25	1 00	June 1898	2,272,500	C.
69	Parrot	Montana	230,000	2,300,000	10	30	July 1898	2,000,898	C.
70	Pennsylvania Consolidated	California	51,500	5,150,000	10	05	June 1898	38,775	
71	Portland	Colorado	3,000,000	3,000,000	1	01½	June 1898	1,492,898	G. S.
72	Princess	Colorado	1,000,000	1,000,000	1	00½	Feb 1897	45,000	G.
73	Quincy	Idaho	100,000	2,500,000	25	3 00	Feb. 1898	9,370,000	C.
74	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	02	April 1897	40,000	
75	Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G.
76	Reco	British Col.	1,000,000	1,000,000	1	10	Jan 1898	287,500	S. L.
77	Sacramento	Utah	1,000,000	5,000,000	5	00½	June 1898	35,000	G.
78	Santa Rosalia	California	100,000	100,000	1	10	Feb. 1898	125,000	G. S.
79	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	June 1898	3,300,000	S.
80	South Swansea	Utah	150,000	150,000	1	05	April 1898	90,000	S. L.
81	Standard	California	200,000	20,000,000	100	10	Mar 1898	5,654,940	G. S.
82	St. Joseph	Missouri	250,000	2,500,000	10	15	Oct 1897	24,000	L.
83	Silver King	Utah	150,000	3,000,000	20	25	June 1898	1,575,000	S. L. G.
84	Slocan Star	British Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	
85	Smuggler	Colorado	1,000,000	1,000,000	1	01	June 1898	1,035,000	S. L. Z.
86	Smuggler Union	Colorado	50,000	5,000,000	100	1.00	Oct 1896	150,000	G. S.
87	Swansea	Utah	100,000	500,000	5	05	June 1898	100,000	S. L.
88	Tom Boy	Colorado	200,000	2,000,000	10	10	Dec 1896	600,000	G.
89	Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1898	5,330,000	O.
90	Union	Colorado	1,250,000	1,250,000	1	01	June 1896	73,000	S.
91	Utah	Utah	100,000	1,000,000	20	01	Dec. 1897	177,000	G. S.
92	Utah Consolidated	Utah	30,000	150,000	5	02	Sept 1896	3,070	S. L.
93	Victor	Colorado	200,000	1,000,000	5	50	June 1898	955,000	G.
94	Vindicator	Colorado	1,500,000	1,500,000	1	05	July 1898	76,125	G.
95	Western Mine Enterprise	Montana	500,000	500,000	1	20	Jan 1898	48,680	
96	War Eagle	British Col.	500,000	500,000	1	01½	July 1898	264,750	
97	White Water	British Col.	125,000	625,000	5	32	April 1898	194,000	

S, Silver. G, Gold. L, Lead. C, Copper. Q, Quicksilver. I, Iron. Z, Zinc.

**KLONDIKE MACHINE.**

If you are going to the Klondike or any other country to placer mining you cannot afford to be without one of our placer machines. It will work any class of placer ground, river or sea sands, it will make a clean saving of the fine float gold as well as the coarse. The material is separated into four different grades in passing through the machine, a coarse screen is arranged over the hopper to cut out the rocks and gravel; it is fed regularly on to the screen below; a series of riffles are arranged at the end of this screen to catch any coarse gold that will not pass through the screen, the material then passes over the riffle table (steel hungarian riffles) on to the screen over the amalgamating plates and cylinder, this fine screen cuts out all the coarse gangue, allowing nothing but the water and fine material to pass through the Amalgamator, this avoids any scouring whatever. The screen over the cylinder has a side shake; the riffle table and hopper has an end shake moving both together, can be set at any pitch, each separately, can be run fast or slow to suit the work being done, this machine is just the machine for dry countries, as it requires very little water. By attaching one of our pumps the water can be used over and a large amount of work can be done with a small amount of water, the pump will lift water 20 feet from a stream or well. As a gold saver this machine has no equal, it is light, simple, and durable, can be packed, the heaviest piece weighing 50 pounds, built almost entirely of metal, three sizes, price \$50, \$100, \$150, capacity 10, 25 and 40 tons; weight, 175, 400, and 500 pounds. Send for full descriptions.

PACIFIC MINING MACHINERY CO.
129 First St., San Francisco, Cal.

**The Pulsometer Steam Pump**

"THE MINER'S FRIEND"
Often Imitated—Never Equaled Over 20,000 in Use

RECENT IMPORTANT IMPROVEMENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining, Quarrying, Railroad, Irrigation, Drainage, Coal Washing, Tank-filling and for Pumping Back Liquids heavily impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump.

AGENTS

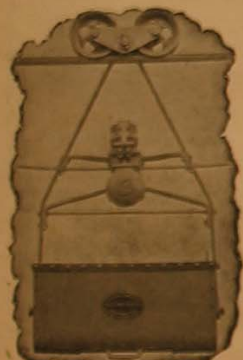
PARK & LACY CO., A. M. HOLTER BROS. CO., MITCHELL-Lewis & ST. AVER CO.
San Francisco, Cal. Helena, Mont. Portland, Oregon.

Pulsometer Steam Pump Co.

133 Greenough Street, New York City

WEBBER PATENT COMPRESSION GRIP

IS USED ONLY ON THE PATENT

**Bleichert Wire Rope Tramway,**

AND OTHERS, MANUFACTURED BY

THE TRENTON IRON COMPANY,

TRENTON, NEW JERSEY.

ENGINEERS AND CONTRACTORS

AND

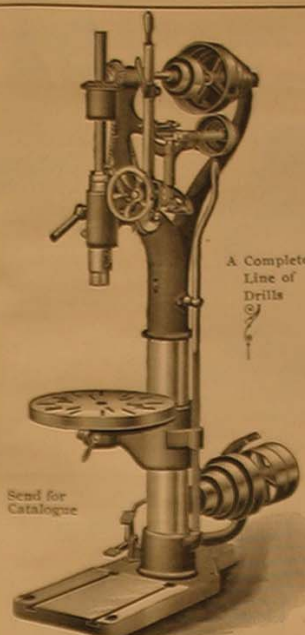
Sole Licensees in North America for the Bleichert System

Also, Wire Rope Equipments
for Surface and Underground Haulage, Transmission of Powers, Etc.

NEWTON M. BELL, AGENT

109 California Street,

SAN FRANCISCO, CAL.



Send for
Catalogue

UPRIGHT DRILLS

THAT ARE MADE BY

W. F. & JOHN BARNES CO.,

105 Ruby Street, Rockford, Ill.

ARE SOLD IN

San Francisco by

HENSHAW, BUCKLEY & CO.

Established 1872.

F. E. BRANDIS, SONS & CO.

ENGINEERING

INSTRUMENTS

FOR ALL PURPOSES.

812-814 GATES AVE., BROOKLYN, N. Y.

Catalogues mailed on application.

Founded by Mathew Carey, 1784.
HENRY CAREY BAIRD & CO.,
Industrial Publishers, Booksellers and Importers
810 Walnut St., Philadelphia, Pa., U.S.A.
Our new and revised Catalogue of Practical
and Scientific Books 92 pages, 8vo, complete to
February 1, 1898, and our other catalogues and
Circulars the whole covering every branch of
Science applied to the Arts, sent free of postage
to any one in any part of the world who will furnish
his address.

THEODOR LEXOW

105 Broadway New York

Importers of

CARBONS

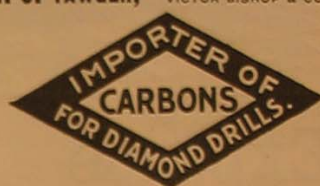
— FOR —

DIAMOND DRILLS and all Mechanic

Purposes

Henry Demmert

I. G. YAWGER, SUCCESSOR TO
VICTOR BISHOP & CO.



21 MAIDEN LANE

NEW YORK

CLEANED WITHOUT ALTERING ADJUSTMENT
THE LEVER RULING PEN
SEND FOR DESCRIPTIVE CIRCULAR.
THEO. ALTENEDER & SONS, PHILADELPHIA

DENVER PUBLIC --- SAMPLING WORKS,

M. E. SMITH, PRESIDENT.

ORES SOLD ON THE
PUBLIC MARKET.

Denver, Colo.

MINERALS WANTED

Gold and Silver Quartz Specimens, Crystals,
Opals, Turquoise, etc., etc.

Buy in Any Quantities—Pay good prices—Cash

E. C. MOLLER,

538 EAST 86TH STREET,

NEW YORK

Dividend Paying and Investment Mining Stock

W. E. HUBBARD & CO.,

Tel. 505

15 W. 2d South St., Salt Lake City, Utah

CALDWELL BROS.

Tacoma and Seattle, Wash.

MANUFACTURERS AGENTS

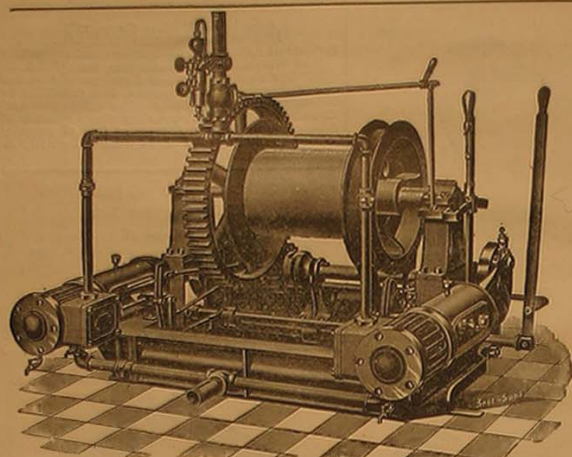
AND DEALERS IN

MACHINERY & MINE SUPPLIES

We carry a Very Large and Complete Stock



It Will Pay You to Write Us for Quotations



BAKER & HAMILTON,

HIGH GRADE

Engines, Boilers, Ice Machines, Mining Tools, Etc., Etc.

THIS CUT represents one of our improved DOUBLE STEAM HOISTING ENGINES. We have them in sizes from 12 H. P. up (with or without boilers). They are constructed with the greatest care by engineers familiar with the best previous practice. They come with sectional iron frames, reversible link motions, etc.; consequently can be shipped knocked down, in pieces suitable for transportation over difficult roads and trails. We also have them with the Single Engines from 6 H. P. up; Boiler and Engine contained on same frame.

Write for Prices; They Will Interest You.

SAN FRANCISCO, CAL.

BRANCH HOUSES:
Sacramento and Los Angeles.

FACTORY:
Benicia, California

Expense

In the operation of Mines
is reduced by using our

Car Wheels.

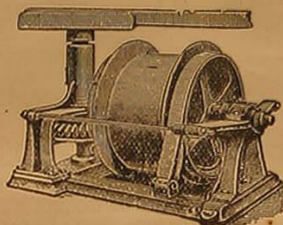
Price and wearing qualities
reduce the expense.

Globe Iron Works

STOCKTON, CAL.

WRITE FOR PRICES.

EL PASO AUTOMATIC HORSE WHIM



This is the latest improved horse power hoist offered prospectors, possessing all the best features of other styles with improvements added. The end thrust is entirely done away with, thus increasing the efficiency and saving considerable wear. The automatic safety break is so arranged that accident is impossible, being in position until held out by operator to lower bucket. It is made entirely of iron and steel. Weight, about 1,200 pounds. Heaviest single piece, 275 pounds. Price, f.o.b. Colorado Springs, \$80. Cars, Buckets, Rope, Rails, etc.; The Climax Engines. Manufactured by

The Russell Iron Works Co.,
COLORADO SPRINGS, COLO., U. S. A.

UNION HARDWARE & METAL CO.

DEALERS IN

Boiler Tubes, Iron Pipe and Fittings
RAILROAD, MILLING, MINING and FOUNDRY SUPPLIES

14 and 216 N. Los Angeles Street

Los Angeles, Cal.

Assaying in all its Branches.

Determinations Accurately Made



The Bi-Metallic ...

Assay Office
and Chemical Laboratory

R. A. PEREZ, E. M., Manager

Formerly: Chief Assayer in El Paso Smelting Works, El Paso, Texas.
Assistant Chemist Consolidated Kansas City Smelting and Refining Co.,
Argentine, Kansas.

124 South Main Street,

Los Angeles, Cal.

IMPERIAL

(Trade Mark)

BOILER COMPOUNDS

For the Prevention and Removal of Scale—in Steam Boilers.
Please mail us a specimen of your Boiler Scale which we will analyze for you Free of Charge and
prepare a compound for your special case, and guarantee satisfactory results.

ESTABLISHED 1876

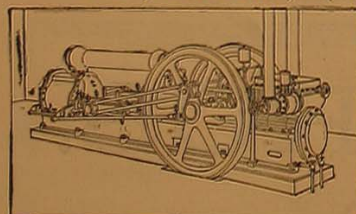
IMPERIAL CHEMICAL CO.,

Indispensable to Mining and Mill Men
Office and Laboratory,
322 N. American Street, Philadelphia, Pa.

NORWALK IRON WORKS CO.

SOUTH NORWALK, CONNECTICUT.

THE NORWALK AIR and GAS COMPRESSOR



In use in every State in the Union, Central
America, and South America, Great Brit-
ain, etc., Also used by the U. S. Army
and Navy.

Especially Designed for
Driving

ROCK DRILLS,
PNEUMATIC LOCOMO-
TIVES, ENGINES, PUMPS
COAL CUTTERS.

And Other Mining Machinery. The Best Machine for Compressing Air for all Dynamic Purposes.
Send for Illustrated Descriptive Catalogue.

HENSHAW, BULKLEY & CO., Agents San Francisco

STEEL CASTINGS

From 1 to 40,000 pounds
weight

Of Open Hearth or Chester Steel. True
to Pattern, Sound, Solid. Gearing of all
kinds and Crank Shafts. Shoes, Dies,
Crusher Plates, Bosses, Tappets and Roll
Shells. Steel Castings of every descrip-
tion.

Chester Steel Castings Co.,
Works, Chester, Pa., Office, Library St.
Phila., Pa.



Randsburg Gold Fields VIA Santa Fe Route

Leave Los Angeles, 9:50 a. m.
Leave San Bernardino 12:10 p. m.
Arrive Barstow 3:15 p. m.
Leave Barstow 3:55 p. m.
Arrive Kramer, 5:05 p. m.
Arrive St. Elmo, 5:25 p. m.
Arrive Johannesburg 6:50 p. m.

Returning Trains Leave
Johannesburg 9:00 p. m.
Arrive San Bernardino 5:35 a. m.
Arrive Los Angeles, 8:25 a. m.

A through passenger coach is run between
Barstow and Johannesburg.

Through tickets and particulars of any Santa
Fe Route Agent.

Stage leaves Johannesburg for Ballarat on Sun-
days and Thursdays at 7 a. m.; returning arrives
at Johannesburg on Tuesdays and Fridays at
8 p. m.

SAN FRANCISCO OFFICE
644 MARKET ST.

LOS ANGELES OFFICE
200 S. SPRING ST.



BUFF & BERGER Mining Transits

With patent interchangeable
auxiliary, Telescope for use on
top or side in vertical sighting.
Our friends are cautioned
against infringements foreign
or domestic as attempts have
been made of late to mislead
the public.

SEND FOR CATALOGUE.

11 Province Court, Boston, Mass.

Mines Examined Processes Tested

HORACE F. BROWN, M. E.

PATENTEE OF
BROWN'S SYSTEM OF MECHANICAL ROASTING
FURNACES, Complete Automatic Milling
Processes, Etc.

1606-7 MANHATTAN BLDG., CHICAGO

JOHN STEWART

MINING ENGINEER

Address:—Mining and Metallurgical Journal
LOS ANGELES, CAL.

Examines and Reports on Mineral Properties

Ores! Ores! Ores!!

Gold, Silver and Lead Ores and Concentrates

Purchased at Reduced Rates for Treatment.

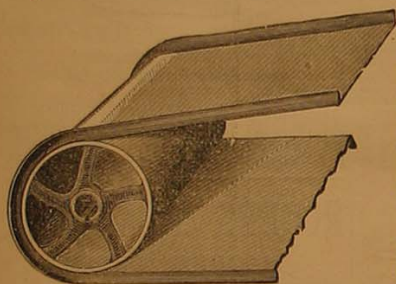
Selby Smelting and Lead Co.

416 MONTGOMERY ST., San Francisco

Consign Shipments to Vallejo Junction, Cal.

W. O. ABBOTT, ASSAYERASSAYING IN ALL ITS BRANCHES
CHEMICAL DETERMINATIONS ACCURATELY MADE

TOMBSTONE - - - ARIZONA

Spadone's Concentrator Belts Patented

This illustration shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. *We avoid this Mechanical Defect by our Spadone Curved Edge.* Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

Send us your order for Water, Air Drill, Steam, Suction and Fire HOSE, RUBBER BELTING, RUBBER PACKING and LEATHER BELTING.

The Gutta Percha Rubber and Manufacturing Company,

30 and 32 FREMONT STREET,

SAN FRANCISCO, CAL.

MATTISON & CO.29 LIBERTY ST.,
NEW YORK CITY**ANTIMONY**

BUY

ANTIMONY ORES AND

CRUDE ANTIMONY

* WRITE FOR FULL PARTICULARS

**ASSAYERS AND CHEMISTS
WADE & WADE**

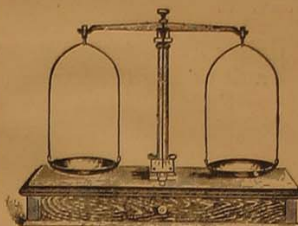
Best and Oldest Establishment in Southern Cal.

115 1/2 N. Main St., Los Angeles, Cal

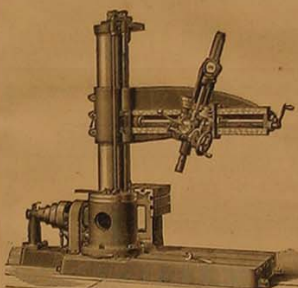
C. DUCOMMUN,

300-302 N. MAIN STREET,

LOS ANGELES

**Assayers Material
Mine and Mill Supplies**

Dixon's Black Lead Crucibles, Denver Fire Clay Crucibles, Muffles, Scorifiers, etc.; Quicksilver, Drill Steel, Retorts, Mortars, Gold Pans, Drilling Hammers, Drifting Picks, Horn Spoons and Shovels.

Half Universal Radial Drills

The special features which have so highly recommended this style of Drills are our double columns, steel gearing, power and hand feeds, quick return motion to spindle. Furnished in three sizes, with large variety of tables, adapting the drills for every class of work possible.

Bickford Drill and Tool Co.

CINCINNATI, OHIO, U. S. A.

HENSHAW, BULKLEY & CO., AGENTS • San Francisco, Cal.

WHITNEY COMPANY**Iron and Steel. Miners, Blacksmiths, Machinists Supplies**

Agents for Arizona and New Mexico for Marsh Steam Pump. Agents Hercules High Explosives. Miner's Supplies by car load. Fairbanks-Morse Hoisting Machinery and Engines. Full line of Steam Fittings and ENGINEERS Supplies. A specialty made of Supplying the Mining Trade of the SOUTH-WEST

ALBUQUERQUE

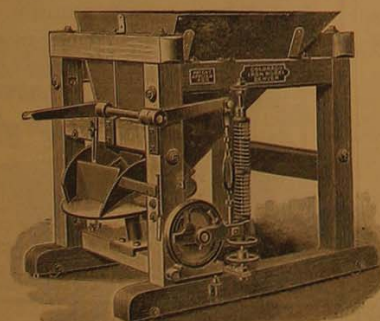
*

*

*

NEW MEXICO

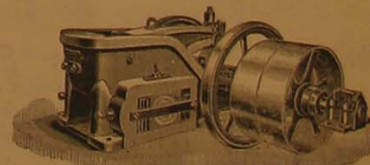
When Installing a Tramway Have the

**The Only Automatic
(Double rope) Tramway Built**CHALLENGE ECLIPSE ORE FEEDER
Will feed both wet and dry ores**Finlayson Patent Automatic Wire Rope Tramway**Economy
in OperationSimplicity in
ConstructionEasy
Running**THE COLORADO IRON WORKS COMPANY,**
ESTABLISHED 1860 **DENVER, COLORADO.** SOLE MANUFACTURERS

ENGINEERS AND MANUFACTURERS OF

**Ore Milling
and Smelting
Equipments**

CATALOGUE ON APPLICATION



BLACK HAWK ORE BREAKER

A. A. BAILEY

MANUFACTURER AND DEALER OF THE LEADING

Packings and Engineers Supplies

LUBRICATING OILS AND COMPOUNDS

Exclusive Manufacturer of the **UNSURPASSED****BAILEY**

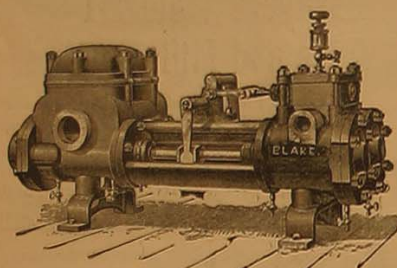
Anti-Friction Metal and all other Grades of Babbitt Metal

Sole Agents for Reliable Steam Pumps

300 South Los Angeles Street, - - - LOS ANGELES, CAL.

Geo. F. Blake Mfg. Co.

NEW YORK, N. Y.



Boiler Feed Pumps,
Tank or Light Service
Pumps,
Combined Air and Circu-
lating Pumps,
Drainage and Irrigating
Pumps,
Special Fire Pumps,
Independent Air Pumps
and Condensers
Water Works and Power Pumps.

Henshaw, Bulkey & Co., Agents. San Francisco, Cal.

"READY ROCK" ASPHALT ROOFING

THE STANDARD ROOFING OF THE UNITED STATES

Absolutely the most durable, convenient and strongest roofing material made.

"Ready Rock" Asphalt Roofing Co.

1006 North Main Street,

Los Angeles, Cal.

TELEPHONE MAIN 1575

Why SEND YOUR MONEY EAST FOR

Shoes and Dies, Camp Tappets, Car Wheels, Shafting, Hangers,
Pulleys, Ore Cars and Iron and Brass Castings, when they can
be obtained for the same price and in less than half the time

AT THE

Albuquerque Foundry and Machin Works,

Repairing of Mill and Mining Machinery a Specialty, Albuquerque, New Mexico

**F. A. A. WILLIAMS,
Mines & Mining**

A free Milling Gold Property at a bargain
Correspondence Solicited

TRINIDAD, COLORADO

ASSAYERS AND CHEMISTS

Working tests of Ores by all processes.
Samples by mail or express solicited

TREMAINE & FROELICH,

132 Third St., PORTLAND, OREGON

N. D. BURLINGHAM, M. E.

Practical Examinations of Mines
anywhere. Plans and estimates
for Mining Machinery on
short notice.

FORTY YEARS EXPERIENCE IN MINING AND MILLING
315 W. FIRST STREET, LOS ANGELES.

CHICAGO SCHOOL OF ASSAYING,

J. DUNRAVEN YOUNG, Director.
1759 MONADNOCK BLDG., CHICAGO, ILL.
Courses in Elem Chemistry, Chemical Analy-
sis, Fire Assaying of Gold, Silver, Copper and
Lead Ores, etc. Ore Testing, including Mill
Runs by Mercury, Cyanide and Chlorination
processes. Individual instruction only. Open
evenings. Opportunity for Miners & Prospectors.

Harper & Reynolds Co.,**MINING SUPPLIES**

AGENTS FOR

Judson Dynamite and Powder Co., Galvanized Spiral
Pipe, Steel and Iron.

152-154 North Main Street,
151-152 North Los Angeles Street,

LOS ANGELES, CAL.



California Bellows Manufacturing Co.
123 Beale St., San Francisco, Cal.

MANUFACTURERS OF

BLACKSMITH BELLOWS

And Bellows of Every Description

Write us for our new Catalogue

THE CHEAPEST PLACE ON EARTH

TO OUTFIT A MINE IS AT

The J. H. MONTGOMERY MACHINERY CO.,

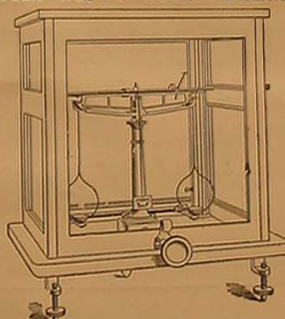
1220-22 Curtis St., Denver, Colo., U. S. A.

Just Listen—Reliable Common
Sense Steel Whim, price reduced
to \$100. Steam Hoisters, \$300 and
up; hand hoisters \$30; steel ore
buckets all prices; prospectors'
stamp mills \$300. A 10-
stamp mill, now
\$50 lb. stamps,
high mor-
tars.

latest improved, only \$800. Ores tested and
amalgamation and concentration mills built to
fit the ore and guaranteed to save what we say.

Coal Mine equipments, Screens,
Jigs, Trunways, Arastors, Chilian
Mills, Ore Sacks, etc. Cornish
Rolls, 12x20, weight 6,000 lbs.,
price \$350; Feeders, Rock Drills
and Compressors, Bumping
Tables, Chlorination Mills, etc. Blake Crush-

ers, 7x10, weight
8,100 lbs., only \$250.
Cyanide Mills.
Our patent
Turntable Car
has equal load
on each
wheel, wears
even, dumps au-
tomatically. Our 100
page catalogue with
hundreds of useful tables,
FREE. Best Machinery and
least money for it.

QUEEN NO. 4 ASSAY BALANCE

Aluminum Beam, Agate Knives and Planes.
Sensibility 1-to mg. The Best Low-Price Assay
Balance on the Market. Send for Circular.

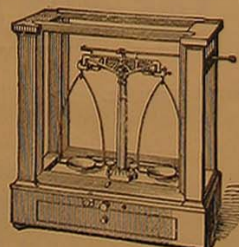
QUEEN & CO.,

Optical and Scientific Instrument Works
1010 Chestnut Street,
N. Y. Office, 116 Fulton St Philadelphia

ESTABLISHED IN 1840

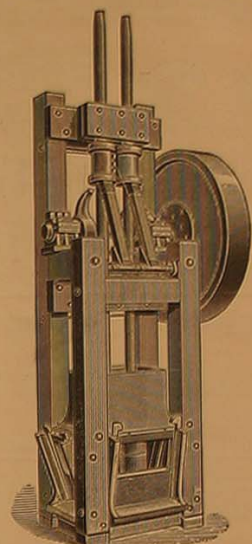
HENRY TROEMNER,

710 Market St., Philadelphia, Pa.

**Assay Balances and Weights**

in use in all the U. S. Assay Offices
in America

PRICE LIST ON APPLICATION.

"HENDY" IMPROVED**Triple Discharge Two-Stamp**

MILL

Capacity six to ten tons per day
PRICE, \$450.00

JOSHUA HENDY MACHINE WORKS

38 to 44 Fremont St., San Francisco, Cal.

ROGERS & BALDWIN,

MACHINE SHOPS

All kinds of repairing
for Engines, Boilers
and Machinery Riverside, Cal.

ANTIMONY.

We buy Antimony Ore in any quan-
tity and pay prompt CASH for same.
Write us and let us know what you
have.

Chapman Smelting Works Co.,

(INCORPORATED)

224 Battery Street. San Francisco, Cal.



Roller, Steel and Special Chains.

ELEVATORS

JEFFREY

CONVEYORS

FOR HANDLING MATERIAL OF ALL KINDS.



WIRE CABLE CONVEYORS.

For long and short distance conveying.

THE JEFFREY MFG. CO.
Columbus, Ohio.

41 DEY STREET, NEW YORK.

Send for Catalogue.

Western Branch, - - Denver, Colorado

F. R. FIELD, MANAGER



Quartz Screens
A specialty. Round, slot or burred slot holes. Genuine Russia Iron, Homogeneous Steel, Cast Steel or American planished Iron, Zinc, Copper or Brass Screens for all purposes, CALIFORNIA PERFORATING SCREEN CO., 145-147 Beale St., S.F.

**E. C. WOODWARD,
Assayer and Chemist**

Telephone 315

24 E. Kiowa St., Colo. Springs, Colo.

KLONDIKE

WANTED—Men and Women to know the cheapest, easiest and best route to KLONDIKE. How to go and make expenses on the way. Circular free for stamp. Agents wanted for steamship line.
G. W. McCoy,
102 1/2 First St., Portland, Or.

Pacific Coast and Mexican Agents

— FOR —

Keasby & Mattison's



**Magnesia Sectional
Steam Pipe and Boiler
Covering**

The only Covering that water will not destroy. Indispensable in covering pipes conducting steam to pumps in mines.

ALL KINDS OF ASBESTOS GOODS
DE SOLLA DEUSSING COMPANY,

Send for Testimonials.

4 California Street, San Francisco, Cal.

**EDWARD B. READ,
Engineers' Specialties, Cylinder and Machinery Oils, Cylinder Lubricators,**

LORD'S BOILER COMPOUND, Cyclone Steam Flue Cleaner, Engine Compound Electric Spiral Packing, Shafting Compound, Crank Pin Grease, Wire Rope Grease, Extra Gear Grease, Belt Grease and Oil, Skin Grease, Elevator Grease, Crescent Flue Scraper, Oil Cups, Compound Cups, Dibble Lubricator, Packing and engineers' supplies.

CORUNDUM WHEELS.

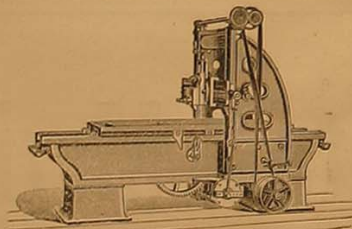
No. 12 First Street,

San Francisco, Cal.

NEW HAVEN MFG. COMPANY

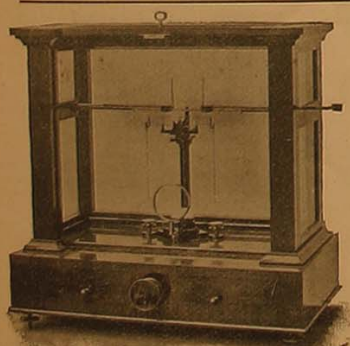
NEW HAVEN, CONN.

**IRON
WORKING
TOOLS,**



Engine Lathes, Pulley Turning Lathes, Iron Planers, Slotters, Upright Drilling Machines, Horizontal Drilling and Boring Machines, Etc.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.



**SMITH & THOMPSON
Manufacturers of
Fine Assay Balances**

Write for Catalogue

2219 Stout street

Denver, Colo.

J. B. Pope

U. S. Mineral Surveyor,
SAN BERNARDINO, CAL.

The Giant Powder Company

+ CONSOLIDATED +

Principal Office: 430 California Street
SAN FRANCISCO, CAL.

*

P. J. NOLAN, General Agent for Mexico
Apartado 230 CITY OF MEXICO.

*

A. A. SPARKS,
Resident Agent Southern California.
Room 438 Bradbury Block, LOS ANGELES, CAL.

*

AGENTS

Roy & Titcomb, Nogales, Arizona
Samuel Hill, Prescott, Arizona
Kellner's Store, Phoenix, Arizona
Thomas Wilson, Tucson, Arizona

A. Calderon, Hermosillo, Mexico
G. Moller & Co., Guaymas, Mexico
Wohler Bartling & Co., Mazatlan, Mex.
Dellus & Co., San Blas, Mexico

Julio Hilderbrand & Co. Durango, Mexico
Julio Hilderbrand & Co., Tofia, Mexico
J. P. De Fresno, Culiacan, Mexico
T. Robison Bours, Alamos, Mexico

Manufactures Dynamite, Black Blasting and Sporting Powders.



TANKS

OF EVERY DESCRIPTION
— FOR —

**Mines, Mills and Cyanide Plants
Patent Non-Shrinking Water Tanks**

The only Tank that will stand the Desert and Hot Climate.

Write for Catalogue and Estimate on any kind of Tank Work.

Pacific Tank Co.

33 BEALE ST., SAN FRANCISCO
348 EAST 2d STREET, LOS ANGELES



To Gold Miners!

Silver Plated Copper AMALGAMATING PLATES

For Saving Gold In Quartz and Placer Mining.

EVERY DESCRIPTION OF MINING PLATES MADE.

Only Best Copper and Refined Silver Used. Old Mining Plates Replated. Twenty-six Medals Awarded.

Gold, Silver, Nickel, Copper & Brass Plating.

Denniston's San Francisco Plating Works

653 and 655 Mission Street, San Francisco, Cal.

— Telephone, Main 5931. —

E. G. DENNISTON,

Proprietor

Send for Circular.

Foos Gasoline and Distillate Engine

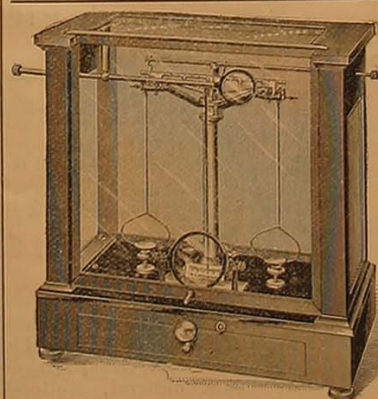
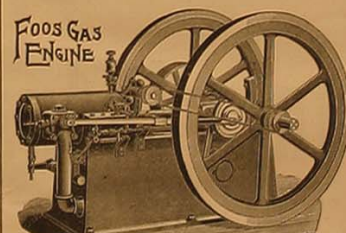
The Best in the Market

Ten Engines lately put in the Rand District operating Hoists, Mills and Pumps. We have sold 300 of these engines and we warrant them satisfactory. The Triumph Pump for deep wells throws a steady stream. No cranks or dead centers. The rods more vertically require less power than other pumps.

Studebaker Vehicles,
Machinery, Engines

S. W. LUITWEILER CO.

200-202 N. LOS ANGELES ST.
LOS ANGELES, CAL.



ESTABLISHED 1859

Herman Kohlbusch Sr

59 Nassau Street,
New York, N. Y.

MANUFACTURER OF

**Fine Balances
and Weights**

For every purpose where accuracy is required.

...

Send for Illustrated Catalogue



THE WILSON

Forged High Grade Steel

Shoes and Dies

Guaranteed to Wear Longer and Prove Cheaper than any others.
Made by use of Special Appliances. Patented Aug. 16th, 1892.

— Made only by —

WESTERN FORGE AND ROLLING MILLS

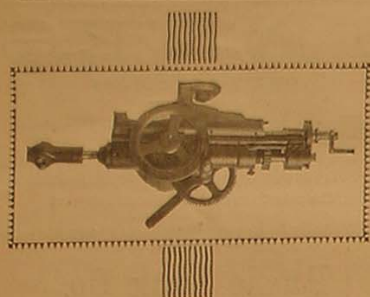
St. Louis, Missouri

JOSHUA HENDY MACHINE WORKS

SOLE AGENTS

38 to 44 Fremont Street,

San Francisco, Cal.



The JACKSON Hand Power Rock DRILL

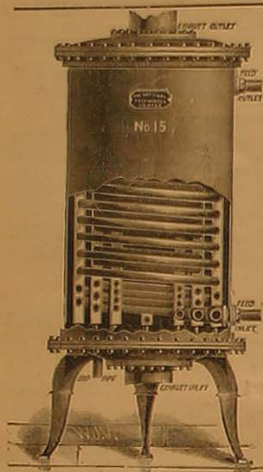
NO JAR

EASILY OPERATED

We also deal in General Mining Machinery and Supplies

The Jackson Drill and Manufacturing Co.
N. Y. OFFICE,
120 Liberty StreetExhibition Rooms,
1709 California St., DENVER, COLORADO, BOX 1352 OFFICES
1757 Larimer St

CABLE ADDRESS: "Jack Drill," New York, A. B. C. Code 4th Edition and Lieber.



The National Feed Water Heater

Highest Premium at World's Fair

800,000 HORSE POWER IN USE

SIMPLICITY
CHEAPNESS
RELIABILITY
EFFECTIVENESS

Henshaw, Bulkley & Co.,

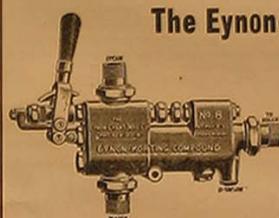
 Agents,
SAN FRANCISCO, CAL.

P. & B. PAINT

 FOR MINES, SMELTERS, CHLORINATION WORKS,
THE CYANIDE PROCESS.

 P. & B. Roofing put up in Rolls to lay 200 square feet, with Paint and Nails.
Absolutely Acid and Alkali Proof.

PARAFFINE PAINT CO., Manufacturers, 312-314 W. 5th St., Los Angeles



The Eynon-Korting Compound Injector

 The Best for
Quartz Mill
and Smelter
Boilers

 Brass, Bronze and Copper Castings of every description.
Send for Catalogue of the
Injectors, Condensers, Blowers, Ventilators, Blast Nozzles
Syphons, Exhausters, Etc.

 THE EYNON-EVANS MFG CO.,
15th and Clearfield Streets, PHILADELPHIA, PA

E. C. CREEL, Presidente.

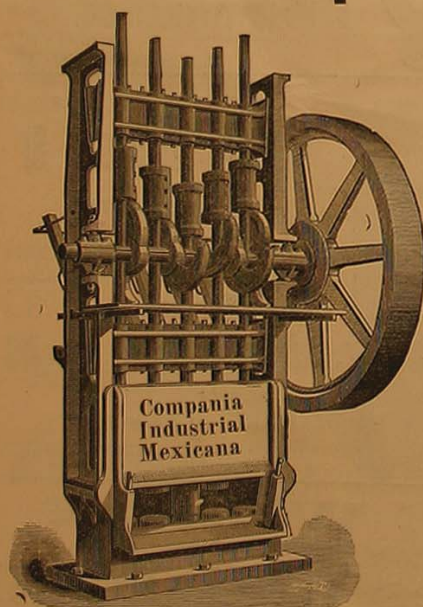
JUAN A. CREEL, Gerente

Compania Industrial Mexicana

Ferreria
Fundicion de Fierro y Bronce

Fabricantes...

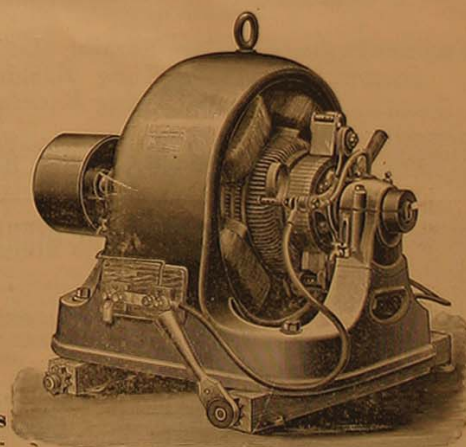
de toda clase de

**Maquinaria para minas y
Haciendas de Beneficio**


BARATURA y PRONTITUD.

Se envian circulares Pedido.

Para informes dirigirse al gerente,

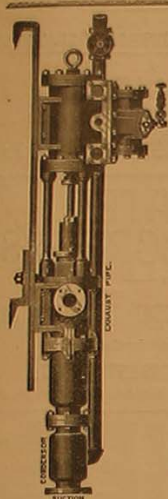

**Dinamos, Motores y Material
Electrico.**

Se solicita la correspondencia.

Chihuahua,

JUAN A. CREEL,

Mexico



W. T. CARRATT & CO. Brass Machine Works.

MANUFACTURERS

HOOKE STEAM PUMPS,
MINERS' SINKING PUMPS,
TRIPLE PLUNGER PUMPS,
JACKHEAD MINING PUMPS,
CENTRIFUGAL PUMPS,
GONGS FOR MINE SIGNALS,
LUBRICATORS & OILERS,
SUCTION HOSE AND COUPLINGS,
HYDRAULIC PIPES,
IRON PIPE AND FITTINGS
BABBITT METALS,
PACKINGS
REPAIRING PROMPTLY ATTENDED TO.

138 to 148 Fremont Street,
SAN FRANCISCO, CAL.



MINERS' OUTFITS.

IRON MORTARS,
AMALGAM MORTARS,
GOLD WASH PANS,
MINERS' HORNS,
BATEAS, CRUCIBLES,
HORSE-SHOE MAGNETS
MAGNIFYING GLASSES
IRON RETORTS,
CHEMICALS, SCALES,
WEIGHTS, ETC.

Including a full assortment of Mine and Mill Supplies, Assayers' Materials, Etc.

Sole Agents for the Pacific Coast for the

W. S. TYLER WIRE WORKS CO.
Manufacturers of

Steel and Brass Wire Battery Screens.
Agents for Baker & Adamson's Chemically Pure Acids. A full Stock always on hand.

Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr. 1.20; Sulphuric Acid, sp. gr. 1.845.

JOHN TAYLOR & CO.
63 FIRST ST., SAN FRANCISCO
Prices on application.

The State Ore Sampling Co.

DENVER, COLORADO.

Gold, Silver, Lead and Copper Ores and Matte sampled and marketed to the best advantage. With modern mills and machinery our facilities for sampling ores are the best.

Our long experience in the market enables us to obtain the highest prices for all marketable ore. Write for our "Reference Book." Send analysis of your ore for prices and information.

BAILY & MONNIG, Managers.

Silver City Reduction Company

This plant has been purchased and will be operated in the future by the Estate of the late Senator George Hearst of California, under the general management of D. B. Gillette, Jr.

It is the intention of the present management to largely increase the capacity of the plant and equip it with every modern appliance for the successful and cheap treatment of ores and concentrates.

Consignments and Correspondence Solicited. Advances will be made on ores.

Silver City, Grant Co. New Mexico

RIVETED SHEET STEEL WATER PIPE
For Placers, Water Powers, Irrigation, Etc.
THE WEIGLE PIPE WORKS
2949 51 Larimer St. DENVER, COLO.

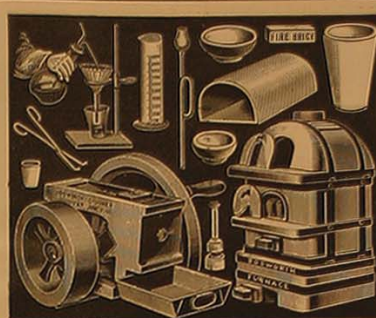
FULTON ENGINE WORKS

Mining, Milling & Smelting Machinery

Estimates Furnished on all Classes of Mining Work

P. O. Box 296, STATION "C"

LOS ANGELES, CALIFORNIA



THE Denver Fire Clay Co

Assayers' and Chemists' Supplies

MANUFACTURERS OF

Crucibles, Scorifiers & Muffles
And all other kinds of

Fire Clay Material.

SPECIALTIES—Strictly c. p. Acids
Test Lead, Bone Ash, Cyanide
Potash, Argol, Borax, Borax Glass
Iron Sulphides, Litharge, Soda
Mining Fluxes, etc.

Sole Agents for the
Ainsworth Balances

OFFICE:

3101-3141 Blake St., 1742-1746 Champa St., Denver, Col.

Analytical Chemists and Assayers

Analysis made of ORES, Waters,
Chemicals, Clays, &c. Umpire
Work a Specialty

HACMIN & MORRISON,
144 Chestnut Street, PHILADELPHIA, PA.

TIMOTHY W. SPRAGUE, S. B.

WITH
CHARLES HENRY DAVIS, C. E.
CONSULTING ENGINEERS

99 CEDAR ST., NEW YORK 4 STATE ST., BOSTON
DREXEL BLDG., PHILADELPHIA
Electric Transmission of Power and Mine
Equipments

FAUTH & COMPANY,

(G. N. SAEGMULLER),
Engineering and Mining Instruments,
WASHINGTON, D. C.

Attention is called to our newly improved
Mining Transit, with best Solar Attachment
and Vertical Sighting Telescope and Quick
Leveling Head.

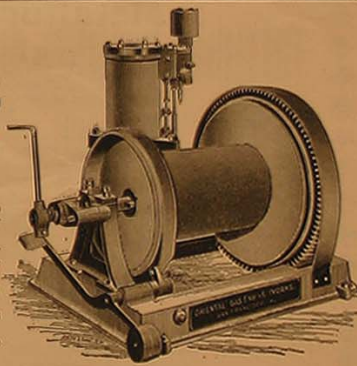
This Cut Illustrates Our
4 H.P. to 8 H.P.

Hoisting Plant

We also build larger sizes to suit
the demands of our
customers.

The Hoist illustrated is designed to lift 1,000
pounds 120 feet per minute with the smaller
sized engine.
It is strong and exceedingly simple and durable,
being entirely under the control of the
operator, by the use of a single hand lever for
hoisting, while the lowering is governed by a foot
lever and brake.

No better device has been designed for this
purpose.
For prices and further information address the
builders.



ORIENTAL GAS ENGINE CO.

105 Beale Street, San Francisco, Cal., U.S.A.

WHITE, ROGERS & COM'Y.

CONSTRUCTING ENGINEERS AND MILLWRIGHTS

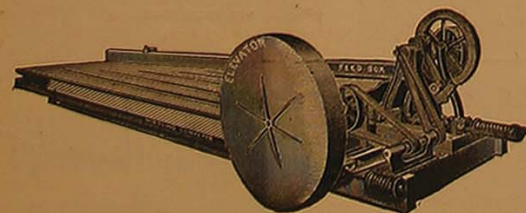
306 PINE STREET, SAN FRANCISCO, CAL.

Sole Pacific Coast Agents and Builders of the Celebrated

WILFLEY CONCENTRATOR,

Price \$450 f.o.b. San Francisco

One of these Machines will take the place of TWO or THREE Belt Concentrators of any make and do very much better work.



WILFLEY CONCENTRATOR

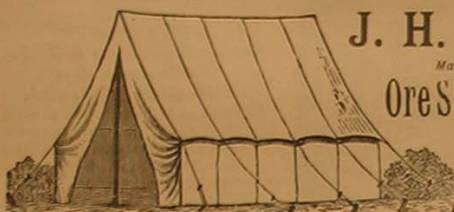
We furnish superior Machinery and erect Stamp Mills, Hoisting and Pumping Works
operated by Steam or Water Motors. Complete Concentrating and Smelting Plants for the
concentration and recovery of gold, silver, copper and lead. Improved Power Drills and Air
Compressors, Wire Rope Tramways, etc.

The Wilfley Table is fully covered by U. S. Patents Nos. 580,338 and 590,675.
Infringements will be prosecuted to the full extent of the law.

These Machines are Kept in Stock Ready for Immediate Shipment

Sulphuric Acid

Manufactured by the **Denver, Col.**
Western Chemical Co.
For Chlorination, Refining and other
processes. Also Muriatic and Nitric
Acids, Blue Vitriol, Copperas Refined
Sulphate of Soda, Etc.



J. H. MASTERS,

Manufacturer of and Dealer in

Ore Sacks Tents and Camp

Furnishings

217 Commercial St.,
LOS ANGELES, CAL.

GOLD and SILVER REFINERS & ASSAYERS.

Bullion Bought. No charges for parting: Gold \$20.00 per oz., Silver and Platinum at
market prices. Assaying in all branches. Working tests made by all processes.
Wastes and Concentrates bought. Prompt attention. Best Services.
Your Trade Solicited

PENN SMELTING AND REFINING WORKS, 901-903 Filbert St., PHILADELPHIA, PA



**PERFORATED
SCREENS**

Steel Plate, Copper and Bronze

For all uses. Send for Catalogue

A. J. BECKLEY & CO.

Works, Garwood, N. J.

New York Office, 123 Liberty Street.

Turbine AND Cascade WATER WHEEL

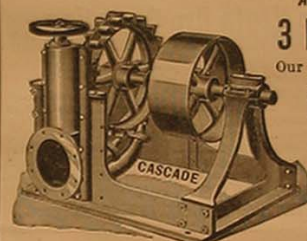
Adapted to all Heads from

3 Feet to 2000 Feet

Our experience of 33 YEARS
enables us to suit every require-
ment of Water Power Plants.
We guarantee satisfaction.

Send for a Pamphlet of
either Wheel and write
full particulars.

James Leffel & Co.
SPRINGFIELD, OHIO, U.S.A.



\$35,000,000 in Dividends paid out by Utah Mines up to date.

UTAH MINING STOCKS

Weekly Market Report on application. Quotations by wire or mail.
Reference: Any Bank in Salt Lake City.

P. J. CONWAY & CO.,

SALT LAKE CITY, UTAH

Head and Shoulders Above 'em all!

If you want to get the miners' trade just
ask him for it, through the columns of

The **Mining and
Metallurgical
Journal**

which as a business getter is head and
shoulders above 'em all.

Offices:

Stimson Block, Los Angeles, Cal.
64-65 Merchants' Exchange,
San Francisco, Cal.

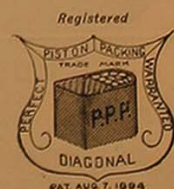


DANIEL'S PATENT P.P.P. Diagonal Rod Packing

For Steam, Water, Oil,
Air, Ammonia, Etc.

SAVES LABOR
SAVES POWER
SAVES MONEY

It Represents Highest Class Materials and Greatest
Service.



NO PAY IF NOT AS CLAIMED

SLIDING WEDGES, COMPENSATING FOR WEAR. OIL CUSHION TO
ENAMEL AND LUBRICATE THE ROD.

Best Packing for use in MILLS, MINES and SMELTERS

MANUFACTURED ONLY BY

C. A. DANIEL, Philadelphia, Pa.

To insure getting the Genuine see
that Every Box and Wrapper has
our Trade Mark.

Stockton Assay Office

Gold and Silver Assays, \$2.00.
Five Assays and over, \$1.50 each

329 E. Magnolia street, Stockton, Cal.
Send Samples and remittances
by Express or mail.

Third Edition Revised and Enlarged.

Prospector's Field Book and Guide

In the search for and the easy determination
ores another useful minerals, by H. S. Osborn, of
58 engravings, 274 pages, by mail \$1.50.
Catalogue M, Mining, Assaying, etc., sent free.

PHILADELPHIA BOOK CO.

15 S. Ninth Street,

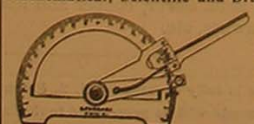
Philadelphia, Pa.

EAGLE PACKING



Also White Eagle, Graphite, Hydraulic, No-frand
other brands for all purposes for which packing
is used. Write for samples and prices. Manu-
factured by James Glandling Co.,
1907-9 North 6th St., PHILADELPHIA, PA.

Mathematical, Scientific and Drawing Instru-
ments



Boxwood
Scales. All
kinds of re-
pairing
promptly
executed.
GUIDO
FERRARI

S. E. Cor. 7th & Chestnut Sts., Philadelphia, Pa.

THOMAS PRICE & SON

Analytical Metallurgical and Physical Testing Laboratory

524 SACRAMENTO STREET, SAN FRANCISCO, CAL.

N. OHLANDT & CO.

MANUFACTURERS OF

Best Quality of BONE ASH for Assayers.

Our Goods are used in all parts of the United States and Mexico.

EXTRA No. 1 and No. 2

CORRESPONDENCE SOLICITED

327 MARKET STREET, SAN FRANCISCO, CAL.

Miners Attention!

We Sell Powder, Caps, and Fuse, Mining Machinery, Belting, Asbestos Goods, packing of all kinds, Picks and Shovels, Iron and Steel; Iron Wheelbarrows, Ore Sacks, Tents, Portable Forges and General Mining Supplies. Agency Truax Mfg. Co and Studabaker Wagons.

WILCOX & ROSE CO.,

San Bernardino, Cal.

**Engineers' and Draughtsmen's Supplies**

Sole agents for Kieffer's round system drawing instruments and Albert Ott's Planimeters, Planigraphs and other instruments of precision. Levels and transits of superior make.

F. WEBER & CO.

1125 CHESTNUT ST., PHILADELPHIA

Subscribe for



the Journal

**Pueblo Foundry,
Machine Shops and
Boiler Works**

— MANUFACTURERS OF —

Wrought and Cast Iron Water Jacket Furnaces, MINING and Irrigation Pumps, Engines, Boilers, Hoisters, Tanks, Derricks, MINING MACHINERY, Brass Castings; light and heavy Forging. New and Second-hand Engines. Boilers and pumps always on hand.

PUEBLO, COLORADO.

EASTERN PRICES BEATEN IMPROVED FACILITIES, FINEST WORK LOWEST PRICES**PERFORATED SHEET METALS**

For Flour and Rice Mills, Grain Separators, Shaker Screens, Gravel and Cement, Revolving and Shot Screens, Stamp Batteries, Iron, Steel, Russia Iron, American Planish, Zinc, Copper and Brass Screens for all uses. Inventor and Manufacturer of the celebrated Slot Burred and Diagonal Slot punched Screens.

MINING SCREENS A SPECIALTY

Mill owners using screens extensively, can contract for large supplies at favorable rates. J. W. QUICK is the only competent and successful manufacturer of Screens on the Coast, having furnished Screens to the Principal Mills of

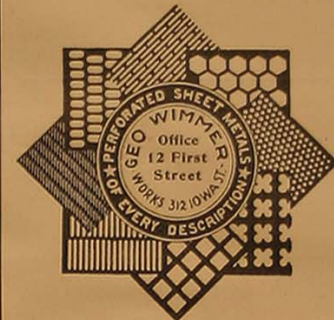
California, Nevada, Alaska, Mexico, Arizona, Central America, Australia and British Possessions.

San Francisco Pioneer Screen Works

(Established 1869)

221 and 223 FIRST STREET, SAN FRANCISCO.

J. W. QUICK, Prop.



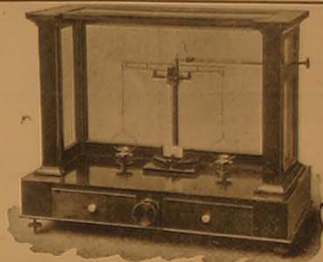
MANUFACTURER AND DEALER IN

Perforated Sheet Metals,

Steel, Russian Iron, American Planish Zinc, Brass and Copper.

Mining Screens of Every Description

SAN FRANCISCO, CAL.

**AINSWORTH NO. 045**

SENSIBILITY.....1-50 MILLIGRAMME

Right-inch beam, single rider attachment, and designed for a silver button balance to carry a heavy load.

Complete catalogue of Assayers' and Chemists' supplies, including this and other balances, mailed upon application. SELLING AGENTS,

The Denver Fire Clay Co.,

1742-1746 Champa St., Denver, Colo.

P. O. BOX, 1540

The Machinery and Electrical Company,**Machinery and Supplies**

MINING HOISTS, WHIMS, ORE BUCKETS, Bates Corliss Engines, Snow Steam Pumps, OIL CITY BOILERS AND ENGINES, Hercules Gas Engines, Lawrence Centrifugal Pumps, GATES IRON WORKS MINING MACHINERY, Tremaine Steam Stamp Mills, Electric Lighting, Railway and Transmission Apparatus, Washburn & Moen Mfg. Co's Wires and Cables

Also Dealers and Jobbers in

Shafting, Belting, Dodge Wood Pulleys, Hangers, Boxes, Etc.

WRITE FOR PRICES

351 & 353 N. Main St. Los Angeles, Cal.

The Kootenai Gold Mining District

of British Columbia, which of late has been attracting considerable attention, is best reached by the Oregon Railroad and Navigation Co. The fact has recently been brought out that the Kootenai district contains within its borders more *High Grade Silver and Lead Mines* than any other part of the world. The recent discoveries of *Rich Gold Lodes* makes it the most attractive country for the *Capitalist Miner and Prospector* to visit in search of mines.

The Oregon Railroad and Navigation Co.

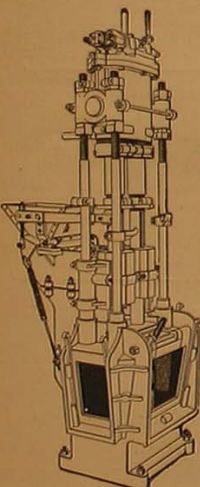
Dispatch Fast Steamers every Four Days

from San Francisco connecting at Portland, Oregon with their rail line for all points in this famous district. For full particulars address,

E. C. WARD, GENERAL AGENT.

630 Market Street,

SAN FRANCISCO, CAL.



TREMACHINE STEAM STAMP

**HALLIDIE
PATENT
ROPEWAY**

— FOR THE —

Transportation of Ore, Fuel and other material, has been erected by us all over the country and is the most economical and efficient method known. Nothing to get out of order; has always given satisfaction.

California Wire Works

[LICENSEES]

Office, 330 Market St., San Francisco, Cal.



Mention the Journal

**WIRE
TRAMWAYS**

Ropeways,
* Incline Planes,
and Railways.

Hoisting Apparatus, Patent Grip Pulleys, Transmission of Power by Wire Ropes; 25 years experience; Send for Ropeway Pamphlet.

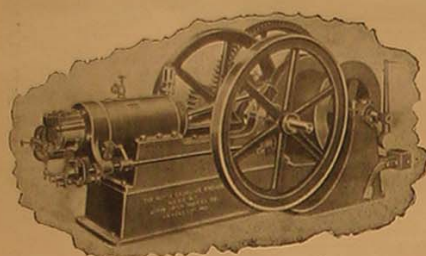
Pacific Coast Agents for

The Calthoun Excavator

A combined power Shovel and Cableway for excavating and handling earth or loose rock.

SEND FOR DESCRIPTIVE CIRCULARS

Witte Gasoline Hoister



Uses Gas, Gasoline, Distillate, Naptha or Kerosene. Requires no Coal, Wood or Engineer and little water. Guaranteed absolutely safe, reliable and durable. Single or Double Drums, Right or Left Handed Geared or Friction.

CHAS. B. BOOTHE & CO.,
LOS ANGELES, CAL.

WITTE IRON WORKS CO.,

1201 Walnut Street,

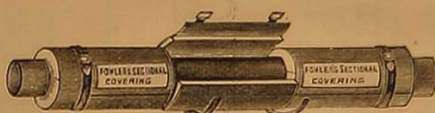
Kansas City, Missouri

Send for Catalogue B

HOME MANUFACTURE FOWLER'S

Fossil Asbestos Manufacturing Co.,
Sectional Removable Covering
for Steam Boilers, Pipes, etc.
As a Non-Conductor, Unequaled
Absolutely Fire Proof

O. C. FOWLER, 656-58 Howard Street,
San Francisco, Cal.



HOFF ASBESTOS MFG. CO., Bryson Block,
Los Angeles, Cal., Agent for Southern Cal

LEHIGH UNIVERSITY

South Bethlehem, Pa.

THOMAS MESSINGER DROWN, LL.D., Pres.

Courses in Civil, Mechanical, Electrical and
Mining Engineering, Metallurgy and Chemistry.
Also Classical and Literary Courses. For further
information, and for Registers, address, *The*
Secretary of Lehigh University, South Bethlehem, Pa.

The Baker & Adamson Chemical Co.

MANUFACTURERS OF

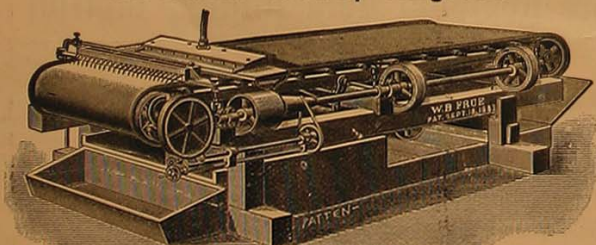
Strictly Chemically Pure Acids and
Chemicals and Ashless Filter
Papers

EASTON,

PENNSYLVANIA

FOUR and SIX FOOT FRUE VANNERS

With Brownell "Patent Lip" Flange Belts



After a Concentrator like the Frue Vanner has been on the market nearly two decades, and the sales have constantly increased, it is safe to say it is the "Standard Machine of the world." More Frue Vanners have been sold during the last twelve months than for the same period at any time during the history of the machine. Practical mining men in all parts of the world where mining is carried on will testify as to its merits. It is the "Standard" which all competitors are trying to imitate.

The results obtained by this machine are the "Acme" of concentration, and several cheap and untried machines that have lately come on the market compare by it, and the manufacturers will tell you that they are "just as good, and cheaper, etc." The facts are that no other concentrator made has an equal capacity, or will yield as clean a concentrate with as small loss in the tailings as the Frue Vanner. The amount saved from the lower first cost of an inferior machine counts little in the years results, when compared with the increased output from a Frue. This machine not only gives better results at both ends of the belt (i.e. Clean product and poor tailings), but is operated at less expense and requires less attention than any other machine on the market. At the Alaska Readwell Mine where they have ordered over 350 Frue Vanners one man attends 48 machines for 1 hour shift.

FOR DESCRIPTIVE PAMPHLETS, ADDRESS

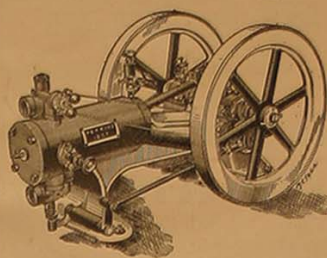
JAMES S. BROWNELL, Western Agent
132 Market Street

FRUE VANNING MACHINE CO.

(Successor to Adams & Carter)

SAN FRANCISCO, CAL.

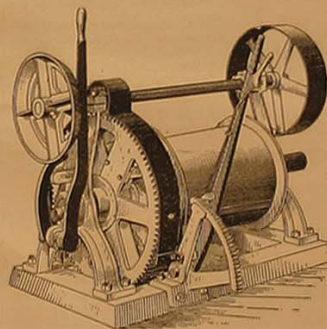
PERKINS Gas Engine



MODEL OF 1897

Composed of Sixteen parts, constructed so plain and substantial that it may be taken to the desert mines without fear of unreliable operations, uses Storage and Dynamo for sparking, the cooling jacket water is used over. Uses about 8-10 of a gallon of gasoline for each horse power for a twelve-hour run. Ten horse power engine weighs 2250 lbs. boxed for shipment.

Perkins Power Hoist



Is light and portable weighing 1050 lbs., heaviest piece weighs 150 lbs., capacity 1000 lbs. one hundred foot per minute will lift 400 feet. A Safety latch follows every foot of the lift, guaranteeing absolute safety.

PRICE \$125.00

For full particulars, apply to

Perkins Pump and Engine Co.

1023 N. Los Angeles St., Los Angeles

DR. W. F. DRAKE, E.M.

Mines and Mining

Reports and Examines Mines. Years of practical experience. Correspondence solicited

P. O. BOX 380

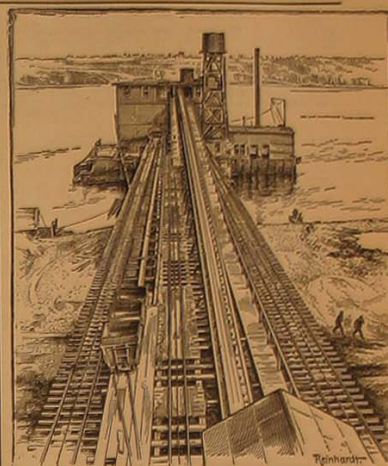
SONORA, Tuolumne County, Cal.

SIMONDS & WAINWRIGHT,

Chemical and Mining Engineers and Analysts

Working tests of Ores by all Processes. Experimental Work on Chemical and Metallurgical Processes. Instructions in Assaying and Chemistry.

No. 20 Platt Street New York



FOR conveying Ore, Coal, Slag and Matte. Send full particulars of your wants in writing for prices.

Robins Conveying Belt Co.,

147-149 CEDAR STREET, NEW YORK

JOHN T. REED

Assayer and Analytical Chemist

Assays made for all valuable metals. Analysis made of all valuable minerals. Special attention given to the sampling of mines. Estimating the value of and testing the nature of their ores. 100 pound lots of ore sampled, and working tests made by Cyanide, Amalgamation and Chlorination Processes.

OFFICE 522 COURT STREET,

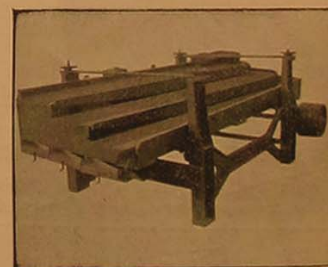
San Bernardino, California

E. E. BURLINGAME'S

ASSAY OFFICE

Established in Colorado, 1866. Samples by mail or express will receive prompt and careful attention. Gold and Silver Bullion refined, melted and assayed, or purchased.

Address 1736 and 1738 Lawrence St., Denver, Col.



The Bartlett Concentrating Table

Capacity 10 to 30 tons daily; size 4x8 feet; weight 800 lbs. Clean separation of all minerals without sizing. Price \$350. Send for description.

American Zinc Lead Co.,

CANON CITY, COLO

Buyers of

ALL CLASSES OF

BULLION MATTE,
ORE and MILL
PRODUCTS
GOLD and SILVER
BARS

CONSOLIDATED Kansas City Smelting AND Refining COMPANY

SMELTING WORKS
LEADVILLE, COLO.; EL PASO, TEXAS;
ARGENTINE, KAN.; BOQUILLAS, MEX.

REFINERY:
ARGENTINE, KANSAS;

OUR PURCHASING AGENCIES:
C. D. Porter, Spokane, Wash.; J. H. Weddle, Denver;
J. E. Jackson, Salt Lake City, Utah; H. R. Simpson,
El Paso Texas; C. E. Finney, Argentine, Kansas.

Manufacturers of

Alchemist-Brand
Blue Vitrol

Zinc Sulphates

THE PUEBLO Smelting and Refining Company,

PUEBLO, COLORADO.

BUYERS OF
Gold, Silver, Lead and Copper Ores,
Copper Matte and Bullion.

Refiners of Gold, Silver, Lead and Copper.

Manufacturers of Bar and Pig Lead, Lead Pipe, Antimonial Lead, Copper Ingots,
Granulated Test Leads and Litharge.

Pays Highest Prices for all classes of Ores.

Especial Attention to Sampling by most Approved Processes.

Quick Returns on all Consignments.



CHAS. B. BOOTHE & CO.

MINING AND MILLING MACHINERY AND SUPPLIES,

Hoists, Horse Whims, Buckets, Wire Rope, Ore Cars

129 SOUTH LOS ANGELES STREET,

LOS ANGELES, CAL

FRANK H. HOWE,

MECHANICAL ENGINEER

Boilers, Engines, Pumps, Complete Steam and Oil Burning Plants

Mill and Mining Machinery

203 North Main Street, Los Angeles, Cal.

RISDON IRON WORKS,

SAN FRANCISCO, CALIFORNIA

Cable Risdon's, Code—A. B. C. & Leibers

MANUFACTURERS OF

GOLD DREDGING MACHINERY AND COMPLETE EQUIPMENT for Placer Mines, OUR SPECIALTY.

We build Gold Dredges Complete in Running Order to handle 2,500 cubic yards per day at a cost of 3 cents per cubic yard.

We excavate 50 feet below water, 20 feet above water and handle boulders up to one ton weight. Send for Dredging Catalogues Nos. 15 and 16.

We also build all kinds of Mining, Milling Concentrating, Pumping, Air Compressing, Hydraulic, Water Wheel and Hoisting Machinery.

EVANS' HYDRAULIC GRAVEL ELEVATORS.

We publish 16 Catalogues. Write for one in the line you are interested in.



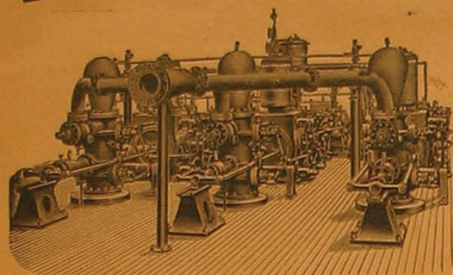
The Mining & Metallurgical Journal



Has its Offices | STIMSON BLOCK, LOS ANGELES, CAL., and
| 54-55 MERCHANTS' EXCHANGE, SAN FRANCISCO, CAL.

Write for Advertising Rates

Do you Want MINING AND MILLING MACHINERY and do you want QUICKLY to get it

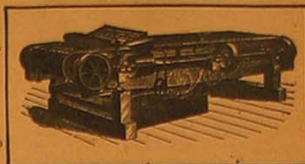


If You Do, Address
Fraser & Chalmers, 133 FULTON STREET, CHICAGO

whose works are exclusively devoted to and adapted for the manufacture of Mining and Ore Reducing Machinery.
During the month of January, 1898, Fraser and Chalmers' Chicago Works received orders for Mills amounting to a total of

Eight Hundred and Fifteen [815] Stamps

and it is significant of their resources that even with this great amount of work in hand, they are still in position to contract for additional work for which **QUICK SHIPMENT** can be made.



JOSHUA HENDY MACHINE WORKS, Nos. 38 to 44 Fremont St. SAN FRANCISCO, CAL.

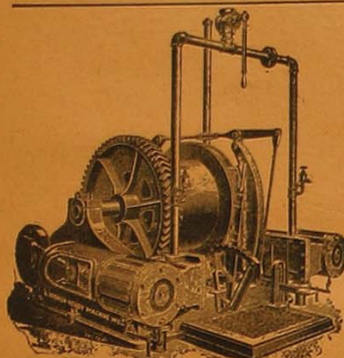
Manufacturers of and Dealers in

The Latest Improved

Quartz Milling, Pumping, Hoisting and Smelting Plants, Air Compressors and Rock Drills.

**"HENDY" IMPROVED "TRIPLE-DISCHARGE" TWO-STAMP QUARTZ MILLS
Boilers, Engines & Pumps of all capacities**

PLANS, SPECIFICATIONS and ESTIMATES OF COST SUBMITTED and CONTRACTS ENTERED INTO FOR FURNISHING and ERECTING MINING and MILLING PLANTS for all conditions of Use.



DOUBLE CYLINDER HOISTING ENGINE

BAKER IRON WORKS

LOS ANGELES, CALIFORNIA

Manufacturers of

Mining and Milling Machinery, Atlas Engines and Boilers, Worthington Steam Pumps



Water Works Machinery
A SPECIALTY

MINING ENGINES Double AND Single Drum

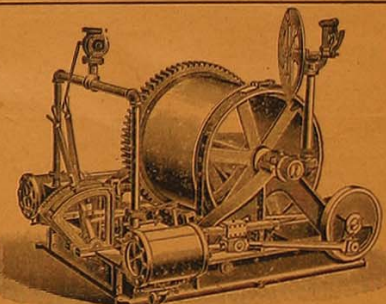
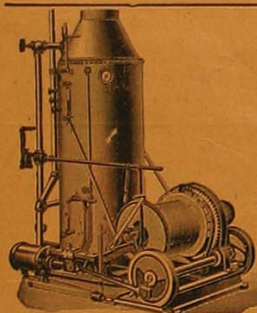
ALSO

Hoisting Engines and Electric Hoists for Every Known use

LAMBERT HOISTING ENGINE CO.

SEND FOR OUR NEW CATALOGUE R

125 POINIER STREET, NEWARK, N. J.



Mining Timbers and Construction Lumber

(At least Long Leaf Yellow Pine Lumber)

Prices given for delivery to any point in Mexico by Rail through Porfirio Diaz, Nuevo Laredo or Paso del Norte, and by Vessel through Gulf Ports of Tampico and Vera Cruz.

Bradley-Ramsay Lumber Co.

LOUISIANA, U. S. A.

ADDRESS INQUIRIES FOR PRICES TO

R. N. WATSON, AGENT.

APARTADO NO. 118 MONTERREY, N. L. MEXICO

PARKE & LACY COMPANY

21 and 23 Fremont St., San Francisco, Cal.



MINING MACHINERY

THE INGERSOLL-SERGEANT AIR COMPRESSORS AND ROCK DRILLS.
SOLE LICENSEE FOR THE MANUFACTURE AND SALE OF

THE ROPP STRAIGHT LINE FURNACE, For Roasting, Chlorinating and Desulphurizing Ores.

WE CARRY IN STOCK

Horizontal, Vertical and Portable Engines and Boilers. Rock Breakers, Cornish Rolls, Pulverizers, Concentrators, Ore Feeders. Hoisting Engines, Horse Power Hoisting Whims, Water Wheels, Steam Pumps, Ore Cars, Wire Rope, Ore Buckets, Water Buckets, Skips. Blowers and Exhaust Fans, Shafting and Pulleys, Belting, Oils and Mine Supplies. **Manganese Steel Shoes and Dies**

Estimates furnished for Complete Plants for Hoisting Works, Smelters, Concentrating and Stamp Mills.

